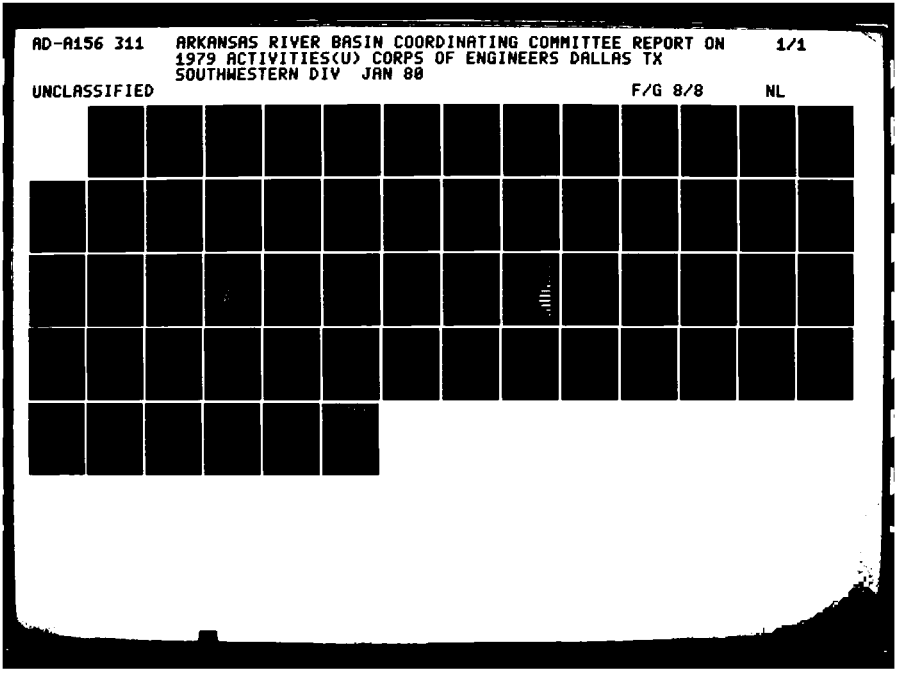
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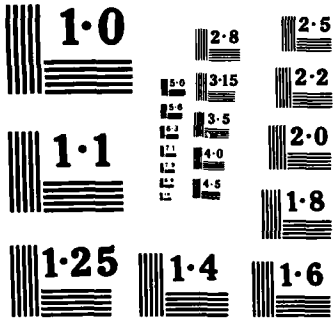

Report on 1979 Activities

ARKANSAS RIVER BASIN COORDINATING COMMITTEE

U.S. ARMY CORPS OF ENGINEERS
SOUTHWESTERN DIVISION Reservoir Control Center

JANUARY 1980

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The Arkansas River Basin Coordination Committee consists of official representatives of the following State and Federal agencies; States: Kansas, Oklahoma and Arkansas. Federal: Corps of Engineers, Department of the Interior, Federal Power Commission, Soil Conservation Service and Southwestern Power Administration

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Fish and wildlife enhancement
Flood control
Navigation
Power production
Recreation

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report is prepared in January of each year to summarize the actual regulation of the Arkansas River Basin reservoirs and navigation system for the previous calendar year. It provides members historical data to use in appraising the results of the past year's regulation and can be used in communicating with their agencies. The report also contains a general summary of planned activities for the coming year.

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STATES

Kansas

Oklahoma

Arkansas

FEDERAL

Corps of Engineers

Department of the Interior

Environmental Protection Agency

Federal Power Commission

Soil Conservation Service

Southwestern Power Administration

ARKANSAS RIVER BASIN COORDINATING COMMITTEE
REPORT ON 1979 ACTIVITIES

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ARKANSAS RIVER BASIN COORDINATING COMMITTEE
REPORT ON 1979 ACTIVITIES

I. PURPOSE AND SCOPE

The Arkansas River Basin Coordinating Committee was organized on 20 March 1970. The purpose of this committee is to provide coordination between state and Federal agencies in the regulation of the water resources of the Arkansas River Basin downstream from Great Bend, Kansas. The Committee requested that a report be prepared each calendar year to provide a summary of the regulation activities for the past year.

The report, prepared in January of each year, summarizes the actual regulation of the Arkansas River Basin reservoirs and navigation system for the previous calendar year. It provides members historical data to use in appraising the results of the past year's regulation and can be used in communicating with their agencies. The report also contains a general summary of planned activities for the coming year.

II. INTRODUCTION

A. The Basin. The Arkansas River Basin has a drainage area of 160,576 square miles. From its source on the eastern face of the Rocky Mountains near Leadville, Colorado, the Arkansas River flows southeasterly through Colorado, Kansas, Oklahoma, and Arkansas, to join the Mississippi River at a point about 575 miles upstream from the Head of Passes, on the Mississippi River. From its source at about elevation 14,000 feet, msl, the fall of the river ranges from 110 feet per mile near Leadville, Colorado, to 2.2 feet per mile at Tulsa, Oklahoma, and 0.4 foot per mile near the mouth. Major tributaries of the Arkansas River are the Salt Fork of the Arkansas, Cimmaron, Verdigris, Grand (Neosho), Illinois, Canadian, Poteau, Petit Jean, and Fourche La Fave Rivers. Plate 1 shows the basin and location of the existing projects.

The upper portion of the basin in Colorado is mountainous and the stream flows through deep gorges and narrow valleys with steep gradients. Below Pueblo, Colorado, the valleys begin to widen and the gradient decreases. Below Great Bend, Kansas (river mile 873.2), the river is crooked and subject to shifting channels. Below the mouth of the Verdigris River, the bank stabilization and channel rectification works now provide a stable channel, suitable for modern barge traffic. Former river channels can be seen several miles from the present stabilized river channels.

The mean annual precipitation ranges from 12 inches in the western portion of the basin to 52 inches at the mouth. The greatest amount of precipitation occurs in late spring and early summer in the western portion of the basin and in late winter and early spring in the eastern portion of the basin. The normal precipitation for selected stations is shown in table 1. The mean annual snowfall ranges from 21 inches near Dodge City, Kansas, to 3 inches in the eastern portion of the basin.

TABLE 1

NORMAL PRECIPITATION

(1941-1970)

	DODGE CITY, KS	WICHITA KS	TULSA OK	FORT SMITH AR	LITTLE ROCK AR
January	0.50	0.85	1.43	2.38	4.24
February	0.63	0.97	1.72	3.20	4.42
March	1.13	1.78	2.52	3.64	4.93
April	1.71	2.95	4.17	4.74	5.25
May	3.13	3.60	5.11	5.48	5.30
June	3.34	4.49	4.69	3.93	3.50
July	3.08	4.35	3.51	3.24	3.38
August	2.64	3.10	2.95	2.91	3.01
September	1.67	3.69	4.07	3.31	3.55
October	1.65	2.50	3.22	3.47	2.99
November	0.59	1.17	1.87	3.08	3.86
December	0.51	1.12	1.64	2.89	4.09
Annual	20.58	30.58	36.90	42.27	48.52

The average annual runoff varies from less than 0.5 inch in the western plains to 18 inches in central Arkansas. Floods occur more frequently during spring months, but records show that large floods may occur at anytime during the year. The recorded flows at Little Rock have ranged from a low of 850 cfs on 23 August 1934 to a high of 536,000 cfs on 27 May 1943. The average recorded flow at Little Rock for a 52-year period ending 30 September 1979 is 40,930 cfs (29,650,000 acre-feet per year).

B. Development. Federal development of the Arkansas River Basin water resources downstream from Great Bend, Kansas, began with the 1936 Flood Control Act (P.L. 738, 74th Congress). A comprehensive report of possible plans of development of the Arkansas River and tributaries for flood control and other uses was published in 1936 as House Document No. 308, Law No. 525, (79th Congress, 2d Session) as amended by Flood Control Acts of 1948 and 1950, authorized plans for comprehensive development of the Arkansas River and tributaries. The approved plan provides for development of the river for navigation, hydroelectric power, flood control, and allied benefits.

There are currently 25 federally constructed reservoirs on the tributaries and 5 on the main stem. Five reservoirs (Big Hill, Candy, Copan, El Dorado, and Skiatook) are under construction. In addition to the reservoirs, channel improvements and 17 locks and dams have been constructed to provide navigation from the mouth of the Arkansas River to Catoosa, Oklahoma. Construction began on the Arkansas River Navigation project in 1957. Navigation reached Little Rock in December 1968;

Fort Smith in December 1969; and the Port of Catoosa, at the head of navigation, in December 1970. Pertinent data for these projects are shown on plates 2 and 3.

The Grand River Dam Authority has constructed three projects in the Lower Grand (Neosho) River Basin for hydroelectric power and flood control. These are Grand Lake (Pensacola), Salina pump-back storage project, and Lake Hudson. In addition to the above mentioned projects, the Soil Conservation Service has constructed numerous detention-type structures to control runoff on the small tributary watersheds.

III. SYSTEM WATER CONTROL PLAN & REGULATION GOALS

A. General. The approved water control plan for the individual projects in the Arkansas River Basin are contained in the water control manual for each project. During 1979, the selection of the System Regulation Plan for the operation of the Arkansas River Basin was made by Little Rock District, Tulsa District, and the Southwestern Division (SWD). The plan was also furnished to the committee members by letter, SWDED-XR, 9 October 1979. This plan for the system regulation of the projects in the Arkansas River Basin will be contained in the master water control manual for the basin. A brief description of the adopted System Plan is presented in paragraph B. Any deviation or revision to these plans is subject to approval of the SWD, Reservoir Control Center (RCC). The goals accomplished are presented in paragraph C below.

B. System Water Control Plan. The System Water Control Plan provides for evacuation of water from flood storage at a variable rate which depends on the severity of the flood. The plan allows for a reduction in the release when only the lower portion of the flood pools are utilized. This reduced release rate allows more of the water to be used for the production of power and aids navigation by providing a "taper" to extend the time flows can be held in the 20,000 to 40,000 cfs range. This "taper" in the release at the end of large floods provides additional time for dredging that may be required to restore the channel to design dimensions. The plan also provides for some release from the power and conservation pools, in order to extend the taper when necessary. The guide curve on plate 4 shows the regulated flow rate at Van Buren which varies according to the time of year and percent of basin storage utilized.

C. Goals for Various Purposes.

a. Fish and Wildlife Enhancement. The Fall River, Elk City, Council Grove, John Redmond, Wister, Blue Mountain, and Nimrod Lakes are regulated for fish and waterfowl enhancement in addition to the other authorized project purposes. This is accomplished through the use of seasonal pool levels. The plans for conservation pool level fluctuations are aimed at producing greater fish and wildlife harvests, and more fishing and hunting benefits.

b. Flood Control. The greatest portion of flood benefits in this basin are from damages prevented to crops and rural structures. About 60 percent of the benefits are obtained from rural areas and 40 percent from urban areas. The reservoirs are regulated according to the criteria prescribed by the plan of regulation for the system to make use of the available storage and downstream channel capacities.

c. Navigation. Arkansas River navigation from Tulsa to the mouth became a reality in December 1970. A navigable depth of 9 feet will be maintained whenever practicable.

d. Power Production. The eight Federal hydropower plants in the Arkansas Basin are integrated into a system of plants located in the Arkansas-White-Red River Basins. The power is marketed by the Southwestern Power Administration (SWPA). Constraints on power generation are designed to minimize loss of energy, meet design capability, and meet the operation requirements for all project purposes.

e. Recreation. Recreation is not an authorized project purpose in most of the reservoirs; however, its importance is highly recognized. Recreation benefits, though difficult to evaluate, are obviously present. When practical, project operations may be restrained to stabilize pools or limit pool fluctuations. The seven Corps lakes which have recreation as an authorized project purpose are Kaw, Birch, Council Grove, Marion, John Redmond, Optima, and Robert S. Kerr. There are also two Water and Power Resources Service (formerly Bureau of Reclamation) lakes, Cheney and Meredith, which have recreation as an authorized purpose.

f. Water Supply. Water supply storage in Federal reservoirs is allocated to a specific user. Reallocation of storage in an existing project from another purpose to water supply is possible under the Water Supply Act of 1958. Whenever a request for such a reallocation is received, the Corps of Engineers determines the amount of storage necessary to provide the required yield and the effect on all project purposes. The proposed reallocation is coordinated with other affected agencies.

g. Water Quality. Releases from projects containing water quality storage are made to meet current water quality flow requirements at downstream control points. Releases are also made for emergency conditions that may occur. Water quality improvement also occurs as a by-product of releases made to satisfy other project purposes.

D. Arkansas River Basin Compact; Arkansas-Oklahoma. The major purposes of this compact are:

a. To promote interstate comity between the States of Arkansas and Oklahoma.

b. To provide for an equitable apportionment of the waters of the Arkansas River between the States of Arkansas and Oklahoma and to promote the orderly development thereof.

c. To provide an agency for administering the water apportionment agreed to herein.

d. To encourage the maintenance of an active pollution abatement program in each of the two states and to seek the further reduction of both natural and manmade pollution in the waters of the Arkansas River Basin.

e. To facilitate the cooperation of the water administration agencies of the States of Arkansas and Oklahoma in the total development and management of the water resources of the Arkansas River Basin.

The major provisions of this compact provide for the apportionment of water between the two states based on a percentage of the annual yield.

E. Arkansas River Basin Compact, Kansas-Oklahoma. The major purposes of this compact are:

a. To promote interstate comity between the States of Kansas and Oklahoma.

b. To divide and apportion equitably between the States of Kansas and Oklahoma the waters of the Arkansas River Basin and to promote the orderly development thereof.

c. To provide an agency for administering the water apportionment agreed to herein.

d. To encourage the maintenance of an active pollution-abatement program in each of the two states and to seek the further reduction of both natural and manmade pollution in the waters of the Arkansas River Basin.

The major provisions of this compact provide for water apportionment based on conservation storage capacity.

IV. SUMMARY OF 1979 REGULATIONS

A. General. The annual precipitation was below normal at every lake in the basin. However, most projects experienced above normal rainfall for one or two months during the year. The annual precipitation at selected index stations ranged from 92 to 118 percent of normal. The following stations are shown as an index for the basin:

	Precipitation - Inches 1979	Normal	Departure From Normal
Dodge City, KS	23.62	20.58	+3.04
Wichita, KS	28.60	30.58	-1.98
Chanute, KS	36.49	39.66	-3.17
Tulsa, OK	42.35	36.90	+5.45
Fort Smith, AR	49.78	42.27	+7.51
Little Rock, AR	52.57	48.52	+4.05

The year began with the flows in the Arkansas River below normal and lake levels, at conservation or below. Beginning the latter part of February, successive rains throughout the basin caused the flows to increase to above normal and remain above normal through the middle of August.

The main runoff producing storms occurred in March, May, June, and November. Fort Supply Lake reached the highest elevation since 1957 when the pool crested at elevation 2015.76 on 12 May. The third highest pool level of record, elevation 502.34, occurred at Wister Lake on 9 June (top of flood pool elevation 502.5). Cheney Lake reached the highest pool level of record, elevation 1429.20, on 2 November (top of flood pool elevation 1429.0).

The last significant runoff producing rainfall of the year occurred in late November with above normal amounts for the month at the Kansas and northern Oklahoma projects. This rainfall and smaller amounts falling in late December were sufficient to keep nearly every project in the basin at or above the conservation pool at the end of the year.

There were seven "navigation tapers" following rises in 1979. The taper operations were impacted by conflicting release and generation requirements but generally improved with each operation. The last taper following the spring rises was very successful and provided the flows needed for navigation during dredging operations.

The total runoff at Van Buren gage for 1979 was 17.6 million acre-feet, as compared to a normal 23 million acre-feet for the 52-year period through 1979. A tabulation of the 1979 maximum and minimum pool elevations for the lakes in the basin is shown on plate 2. The recorded annual and monthly flows for the Arkansas River at Dam No. 13, near Van Buren, Arkansas, are shown on plates 5 and 6. A graph of the outflow from Dam No. 13 is shown on plate 7. Graphs of pool levels are shown on plates 8 through 15 for Kaw, Keystone, Fall River, Elk City, Oologah, Council Grove, John Redmond, Pensacola, Fort Gibson, Tenkiller Ferry, Eufaula, Wister, Blue Mountain, and Nimrod Lakes.

B. Fish and Waterfowl. The 1979 seasonal guide curves for Council Grove, Elk City, John Redmond, Toronto, Fall River, and Marion Lakes were modified from the 1978 curves at the request of the Kansas State Water Resources Board. The objective of the modification was to improve fishery and wildlife benefits. Minor deviations from the seasonal guide curves, due to special operations, are discussed in paragraph J, Special Operations. Nimrod Lake was lowered 12 feet in late 1978, in cooperation with the Arkansas Game and Fish Commission (AG&FC). The purpose of this operation was to control the population of rough fish and thereby affect an improvement in the game fishery. It was refilled by 2 January 1979.

During 1978, the commercial fish catch in the Arkansas River (Arkansas and Oklahoma) was 2.75 million pounds with a value of $930,000. In Oklahoma, the mussel harvest was 1.98 million pounds and had a value of $531,700. In 1978, there were 46 licensed commercial fishermen in Oklahoma and 619 in Arkansas.

C. Flood Control. During the fiscal year ending 30 September 1979, the 27 Corps of Engineers and Section 7, flood control reservoirs prevented $20,049,000 in flood damages in the Arkansas River Basin. The flood damages prevented during the past 16 years are shown on plate 16.

a. Above Fort Smith. Rainfall during the last part of March produced enough runoff to cause most lakes to rise into the flood pool. Successive spring rains kept the lakes in the flood pools until a major basinwide storm occurred 7 through 9 June. The runoff from this storm increased the equivalent basin flood control storage utilized to 15.5 percent. The water control plan for the Arkansas River Basin contains a feature which is referred to as a "navigation taper." This "navigation taper" is used at the end of large floods to extend the time that flows in the river below Van Buren can be held in the 20,000-40,000 cfs range. This provides time for dredging shoaled areas to restore the navigation channel to design dimensions after a large flood. The first "navigation taper" began on 14 June and additional rainfall on 21 June, 1 July, 10 July, 17 July, and 28 July provided enough runoff to continue the "navigation taper" until 10 August.

Rainfall on 20-21 November produced sufficient runoff to cause pool levels to rise an equivalent basin storage of 13 percent. A "navigation taper" was started 25 November with flood releases according to the Van Buren guide curve. There was sufficient floodwater to maintain the "navigation taper" until 17 December.

The following tabulation shows the date of peak pool, elevation, and percent full for the lakes affected by the June storm:

JUNE 1979 STORM

Lake	Top Conservation Pool Elevation (N.G.V.D.)	Maximum Pool Elevation (N.G.V.D.)	Maximum Flood Storage Utilized (%)	Date 1979
Elk City	796.0	807.72	29	12 June
Eufaula	585.0	589.36	32	11 June
Fall River	948.5	968.66	37	11 June
Heyburn	761.5	767.86	16	9 June
Hudson	619.0	521.79	13	14 June
John Redmond	1039.0	1046.80	16	12 June
Pensacola	745.0	746.45	13	14 June
Toronto	901.5	922.17	57	11 June
Wister	471.6	502.34	99.6	9 June
Kaw	1010.0	1015.13	10	13 June

N.G.V.D. = National Geodetic Vertical Datum of 1929

The experienced and natural stages at key stations are shown in the following tabulation:

Gage	Flood Stage (Feet)	Experienced Stage (Feet)	Natural Stage(1) (Feet)	Flooding Prevented (Feet)	Date
Coyville	26.0	*	38.6	12.6	8 June
Altoona	23.0	*	27.4	4.4	10 June
Fall River	16.0	*	29.9	13.9	8 June
Fredonia	17.0	19.9	28.7	8.8	9 June
Independence	30.0	*	40.0	10.0	11 June
Oologah	39.0	*	44.3	5.3	13 June
Inola	42.0	*	44.3	2.3	12 June
Burlington	23.0	*	27.4	4.4	10 June
Iola	15.0	16.3	19.9	3.6	10 June
Parsons	22.0	23.1	26.8	3.7	12 June
Commerce	15.0	19.9	20.3	0.4	13 June
Kaw	944.5	*	949.7	5.2	11 June
Canton	10.0	*	10.7	0.7	9 June
Heyburn	16.0	*	23.1	7.1	9 June
Sapula	19.0	26.5	27.7	1.2	9 June
Jenks	614.0	614.8	615.5	0.7	10 June
Poteau	20.0	22.8	30.3	7.5	8 June
Panama	24.0	25.8	32.8	7.0	8 June
Sallisaw	24.0	*	27.3	3.3	10 June
Van Buren	22.0	22.5	27.9	5.4	10 June

*Below Bankfull

(1) Natural stage would have occurred without the flood control lakes.

b. Below Fort Smith. There were seven minor rises on the main stem of the Arkansas River during the period March through June. These are shown on plate 7. Runoff from rains which occurred during the latter part of March was sufficient to cause most lakes in the upper basin to rise into the flood pool. During this period, 19-23 March, 3.79 inches of rain occurred at Fort Smith and 0.74 inches at Little Rock. Successive rains during the spring continued to produce minor rises with the June storm producing the largest rise of the season on the main stem below Fort Smith. Rainfall during the period 2-8 June was 5.34 inches at Fort Smith and 2.46 at Little Rock. The experienced and natural stages at key stations below Fort Smith are shown in the following tabulation:

STAGES AT KEY STATIONS

Gage	(NWS) Flood Stage	Experienced Stage (Feet)	Natural Stage (1) (Feet)	Approximate Reduction (Feet)	Date
Van Buren	22	21.8	28.8	7.0	11 June
Ozark	357	350.7	359.6	8.9	12 June
Dardanelle	32	19.9	30.8	10.9	12 June
Morrilton	30	21.8	30.6	8.8	12 June
Little Rock	23	13.0	19.2	6.2	13 June
Pine Bluff	47	36.2	39.2	3.0	14 June

(1) Natural stage would have occurred with no Corps of Engineers Reservoirs.

(1) On the Fourche LaFave River Basin, 13 rises were experienced during the year. The flood peaks on all the rises were reduced by Nimrod Lake. The maximum stage recorded at the Houston gage for the year was 30.2 feet on 4 April. This was 6.2 feet above the flood stage of 24.0 feet. Under natural conditions without Nimrod Lake, the stage would have been 32.8 feet. The maximum flood control storage utilized in Nimrod during the year was 54 percent.

(2) On the Petit Jean River Basin, 16 rises were experienced during the year. The peak flows on these rises were reduced by Blue Mountain Lake. The maximum stage recorded at the Danville gage for the year was 24.5 feet on 2 April. This was 4.5 feet above the flood stage of 20 feet. Under natural conditions without Blue Mountain Lake, the stage would have been 26.8 feet. The maximum flood control storage utilized in Blue Mountain during the year was 84 percent.

D. Navigation. Preliminary estimates indicate that about 8.9 million tons of commerce moved on the McClellan-Kerr Arkansas River Navigation System in 1979. This represents a decrease of 13 percent below the 1978 level. Commodities consisted of bauxite, iron and steel, chemicals and chemical fertilizers, petroleum products, coal, sand and gravel, crushed stone, soybeans, wheat, other grains, and miscellaneous commodities. Inbound movements decreased 23 percent and outbound movements decreased 10 percent. Commodities showing an increase in movement from 1978 were

sodium hydroxide, chemical fertilizer, and grains. The increase for these commodities were 53, 24, and 8 percent, respectively. Historical tonnage movements are shown on plate 17. A comparison of the tonnage for 1978 and 1979 is as follows:

	1978* (Tons)	1979* (Tons)
Inbound	2,600,000	2,000,000
Outbound	3,900,000	3,500,000
Internal	3,200,000	2,900,000
Through	500,000	500,000
TOTAL	10,200,000	8,900,000

*Estimated

During 1979, the Arkansas River flows were generally excellent for navigation. The flows at Dam No. 2 were above 150,000 cfs for 3 days, between 75,000 cfs and 150,000 cfs for 90 days and below 75,000 cfs the remaining time. Spring rains created rises on the Arkansas River which caused shoaling in the navigation channel. The shoals were dredged before flows decreased and navigation was not restricted. The Mississippi River stages were normal and navigation conditions on the White River entrance channel were good.

Maintenance dredging to maintain navigable depths amounted to approximately 1.3 million cubic yards in 1979. This was a decrease of about 0.1 million cubic yards from the 1978 dredging requirements. The sailing line in the Robert S. Kerr was shortened by about 2.6 miles by straightening the channel. Approximately 332,700 cubic yards of material were removed at a total cost of $324,641. The dredged material was placed in a shallow lake area to form an island wetland environment which has become popular with aquatic birds.

However, it was necessary to raise navigation pools several times during the year in order to maintain navigation. The limits were 213.5 to 213.8 for depths at navigation mile 97. It was lowered 26 July 1979. Pool No. 7 was raised 26 July 1979 to pool limits of 249.3 to 249.8 when flows are 25,000 cfs or below, by a 4th Indorsement to the Reservoir Control Manual and approved by the 5th Indorsement. These pool limits are still in effect. Pool No. 9, Lake Dardanelle, and Ozark Lake were also raised for navigation depths 26 July 1979. Pool No. 9, Lake Dardanelle, and Ozark Lake were returned to normal pool limits 20 August 1979, 21 August 1979, and 27 August 1979, respectively.

Navigation-related accidents during the year were minor. A tower dolphin at Norrell Lock was damaged by a commercial tow. The alignment cell downstream of Norrell Lock was also damaged by a commercial tow. Guardwell damage was incurred at two locks and parapet wall damage was incurred at another lock. A miter gate at Dardanelle and Lock No. 3 received minor damage.

E. Power Production. At the beginning of 1979, the hydropower storage projects were below their rule curve elevations. This ranged from 2-1/2 feet at Keystone to 6-1/2 feet at Tenkiller. During the spring runoff, the power storage was filled and water was stored in the flood pools at all of these projects. There was sufficient runoff to keep the projects relatively full during the summer, and at the end of the year, only Tenkiller was below the power rule curve.

Webbers Falls No. 3 unit was placed back on line in March 1979. The unit had burned out in September 1977. The monthly hydropower production for the eight Arkansas River Basin Projects for 1978 and 1979 was as follows:

MONTHLY HYDROELECTRIC POWER PRODUCTION
ARKANSAS RIVER BASIN PROJECTS

Month	GWH		Month	GWH	
	1978	1979		1978	1979
Jan	111	84	Jul	169	322
Feb	170	102	Aug	85	180
Mar	335	310	Sep	60	107
Apr	327	353	Oct	19	52
May	386	358	Nov	41	208
Jun	358	348	Dec	44	219
			TOTAL	2105	2643

The annual hydropower production by project for five calendar years, 1975 through 1979, is shown in the following tabulation. A graphical presentation of the fiscal year generation at each of the projects is shown on plates 18 through 25.

HYDROPOWER PRODUCTION (GWH)
ARKANSAS RIVER BASIN PROJECTS

	ACTUAL FOR CALENDAR YEARS					5-Year Average	
	1975	1976	1977	1978	1979	1974-1978	1975-1979
Keystone	355	151	205	183	284	270	236
Fort Gibson	265	161	202	193	242	233	213
Webbers Falls	318	173	214	182*	274*	252	232
Tenkiller	170	101	36	95	82	122	97
Eufaula	399	162	79	147	173	227	192
R. S. Kerr	704	411	469	474	568	581	525
Ozark	469*	186*	308*	272*	286*	318	304
Dardanelle	735	509	612	559	734	659	630
TOTAL	3415	1854	2125	2105	2643	2662	2429

*Forced outages (30 days or more) of 1 or more units due to mechanical problems.

F. Recreation. The lakes and navigation pools in the Arkansas River Basin provide vast expanses of water shoreline for use in meeting the growing demands for water-associated recreation. The natural beauty of the area is considered in planning public use areas at these lakes. Recreational development plans are coordinated with state and Federal park, fish and wildlife, and archaeological agencies.

In the Little Rock District, there are 76 parks planned for development in the McClellan-Kerr Navigation System. Fifty-seven of these parks have been developed under the initial recreation program at a cost of approximately $26 million. The construction of all recreation facilities will be completed in Fiscal Year 1981. Seven other parks have been jointly developed by the Corps and non-Federal interests and two were developed by non-Federal interests. Ten of the parks are reserved for cost sharing and will be developed in the future. The Little Rock District, Corps of Engineers held a statewide lake and river shoreline cleanup day on 8 September 1979. It was considered to be highly successful in all areas. On the Arkansas River, Blue Mountain Lake, and Nimrod Lake there was a total of

1,831 participants. There were 14 sponsors and numerous organizations involved. A total of approximately 68 tons of litter was collected along the Arkansas River, Blue Mountain, and Nimrod Lake. The statewide cleanup is planned to be an annual event with participation by the State of Arkansas.

Special releases were made at Keystone, Robert S. Kerr, and W. D. Mayo in September to provide flows for the annual Labor Day raft race at Tulsa, Oklahoma, and the United Way raft race at Fort Smith, Arkansas. The Arkansas River was closed to boat traffic from the confluence of the Poteau River to Fort Smith Park during the United Way race on 8 September 1979. There were an estimated 8,000 spectators present for this event.

The overall lake attendance for 1979 was approximately 6 percent less than for 1978. The notable decreases in attendance at Marion and John Redmond were primarily attributed to the fuel shortage and economic conditions. The Fort Gibson attendance was affected by poor fishing and the discovery of PCB contamination in fish and sediment of the lake. Lake attendance for the period 1975 through 1979 is summarized in the following tabulation. The lake attendance includes visitation to the lake and associated parks for various recreational and sports activities.

ARKANSAS RIVER BASIN
LAKE ATTENDANCE
(1000's of People)

Lake	Calendar Year 1975	1976	1977	1978	1979
Cheney (1)	575	601	585	662	551
Great Salt Plains	1,136	914	793	930	992
Keystone	3,022	4,129	3,873	4,179	4,156
Heyburn	783	1,124	792	501	709
Toronto	608	634	578	420	357
Fall River	434	520	493	433	372
Elk City	552	686	489	508	293
Oologah	1,421	1,781	1,841	1,801	2,144
Hulah	684	1,125	989	678	580
Birch	-	-	79	111	225

ARKANSAS RIVER BASIN
LAKE ATTENDANCE (CONTI-)
(1000's of People)

Lake	Calendar Year 1975	1976	1977	1978	1979
Council Grove	879	1,060	917	719	649
Marion	794	928	806	693	420
John Redmond	608	528	623	455	277
Grand Lake (Pensacola)(2)	509	1,257	1,259	1,209	1,118
Lake Hudson (Markham Ferry)(2)	35	41	44	64	29
Fort Gibson	4,110	3,570	6,944	7,228	4,451
Tenkiller Ferry	5,226	5,668	6,514	4,064	4,594
Lake Meredith (Sanford)	1,709	1,826	1,631	1,782	(3)
Lake Thunderbird (Norman)(2)	1,356	1,730	1,998	1,329	2,147
Optima	-	-	6	33	37
Fort Supply	550	948	721	674	732
Canton	2,473	2,728	2,843	3,018	2,842
Eufaula	4,694	5,387	6,319	7,242	6,455
Wister	1,086	1,075	1,024	1,087	1,219
Blue Mountain	244	223	232	184	228
Nimrod	493	495	440	444	427
Newt Graham L&D	301	500	726	646	500
Chouteau	294	360	488	534	517
Webbers Falls	542	583	1,142	1,243	994
Robert S. Kerr	848	1,055	1,195	1,834	1,404
W. D. Mayo	144	282	228	296	302
L&D No. 13	583	599	675	757	882
Ozark (Jeta Taylor)L&D	611	860	953	1,022	1,080
Dardanelle L&D	2,202	2,778	3,259	3,441	3,492
L&D No. 9	159	354	345	403	413
Toad Suck Ferry L&D	248	530	541	680	686
Murray	541	811	819	1,005	1,000
David D. Terry	635	824	1,570	1,195	1,173
L&D No. 5	288	255	176	314	240
L&D No. 4	531	615	197	182	499
L&D No. 3	226	231	231	206	194
L&D No. 2	513	639	488	446	379
Norrell L&D	68	68	36	49	54

(1) Attendance shown was furnished by Kansas Park & Resource Board
(2) Attendance shown was furnished by Oklahoma Tourism & Recreation Department. This is for State parks only.
(3) Not available at publication time.

G. Water Supply. Water supply storage space is allocated in 17 of the existing Corps of Engineers lakes in the basin. Contracts for all or portions of this space are in effect at all of these lakes except Optima, Kaw, and Birch. During 1979 a total of 70,252 acre-feet of water was supplied from the storage space in these lakes. This amount is about 29 percent more than the amount used in 1978. The following tabulation shows the lakes which have water supply storage.

Reservoir	Water Supply			Water Supplied (ac-ft)	
	Allocation (ac-ft)	Contracts (ac-ft)	Number of Contracts	1978	1979
Kaw	171,200	None	None	None	None
Keystone	20,000	18,450	4	169	1,752
Heyburn	2,000	2,000	3	759	645
Toronto	400	265	1	85	89
Elk City	24,300	24,300	1	None	None
Oologah	342,600	44,200	6	10,742	35,666
Hulah	19,800	17,700	2	3,639	7,631
Birch	7,600	None	None	None	None
Council Grove	24,400	24,400	1	None	None
Marion	38,300	38,300	1	None	None
John Redmond	34,900	34,900	1	None	None
Fort Gibson	None	None	None	12,997(1)	15,127(1)
Tenkiller Ferry	25,400	18,431	29	4,316	4,404
Optima	76,200	None	None	None	None
Fort Supply	400	400	1	250	210
Canton	107,000(2)	90,000(3)	2	30,445	16,207
Eufaula	56,000	[illegible],109	19	1,252	1,317
Wister	9,600	6,400	2	2,865	2,282
Nimrod	None	33	1	86	76

NOTE: (1) Water supplied to satisfy pre-project water rights.
(2) Water supply - 38,000 acre-feet; Irrigation - 69,000 acre-feet.
(3) Water supply - 38,000 acre-feet; Irrigation - 52,000 acre-feet (currently being used for W.S. by Oklahoma City).

H. Water Quality. A Corps of Engineers dredge material sampling program along the Arkansas River is continuing to determine if dredging areas are polluted according to Environmental Protection Agency (EPA) criteria. Thus far, all area samples have fallen within safe limits established by

EPA and no dredging operations would be prohibited by these criteria. Water quality monitoring along the Arkansas River and many of its tributaries is performed by the US Geological Survey (USGS) and the Arkansas Department of Pollution Control and Ecology on a regular basis. Data for various reaches of the river are available from those agencies.

a. Above Fort Smith.

(1) The Tulsa District has completed detailed water quality studies on Fort Gibson, Tenkiller, and Kaw Lakes. No significant water quality problems have been determined at Tenkiller or Kaw Lakes. PCB contamination was found in fish and sediments of Fort Gibson Lake. Detailed studies were initiated in late 1979 on Oologah, Fall River, Elk City, Eufaula, Birch, Heyburn, and Hulah Lakes. The final report for these lakes is expected in September 1980. Pre-impoundment water quality studies were conducted on Big Hill and Skiatook projects. Completed reports revealed no expected water quality problems. Water quality data were collected at the Arcadia project at regular intervals through 1979 and occasionally at Birch Lake.

(2) Releases from Tenkiller Lake were continued on the same regular schedule as in past years for the purpose of trout fishing below the dam. Also, special releases were made at Great Salt Plains to prevent fish kills in the stilling basin.

b. Below Fort Smith.

(1) The Arkansas River main stem continues to experience excessive turbidity, chloride, and bacteria concentrations. While the total salt load has not diminished greatly, the extremes of concentrations have been leveled out due to the flow regulation features of the project.

(2) The city of North Little Rock is presently upgrading its Faulkner Lake treatment plant and is constructing a new White Oak Bayou Plant to replace a primary treatment plant on Shillcutt Bayou near Burns Park. The projects are nearing completion and should cause a marked improvement in water quality in the Little Rock area.

(3) During periods of low or zero natural flow in the Petit Jean River and Fourche LaFave River, a release of not less than 5 cubic feet per second is made from Blue Mountain and Nimrod Lakes. These releases provide water to the natural pools in the river and aid in maintaining fish life.

I. Sedimentation. Maintenance dredging in the McClellan-Kerr Arkansas River Navigation System during 1979 was about 0.1 million cubic yards less than the dredging required in 1978. The following tabulation shows the maintenance dredging by year since 1972.

Calendar Year	Maintenance Dredging (Million Cu Yards)			Annual Flow @ Van Buren, AR (Million Ac-Ft)
	Tulsa Dist	Little Rock Dist	Total	
1972	1.7	2.4	4.1	14.1
1973	1.1	3.5	4.6	61.1
1974	3.7	3.6	7.3	44.4
1975	0.7	1.4	2.1	33.9
1976	0.5	1.9	2.4	14.3
1977	0.4	1.7	2.1	15.1
1978	0.2	1.2	1.4	16.6
1979	0.5	0.8	1.3	17.6

All historical sediment data for the Tulsa District were compiled and sent to the USGS Oklahoma District for entry in the WATSTORE data system which will enable computer retrieval and statistical manipulation for future studies using the data of several agencies. A computer program was developed for editing hydrographic survey data directly from the cassette tapes generated on board the survey boat. This program displays original and resurveyed range profiles simultaneously on a CRT and enables error corrections, after which, a hard copy plot, tape, or punched cards of the corrected profiles can be obtained automatically.

Additional highlights of the sedimentation program for the year are:

a. Suspended sediment samples are currently collected at 71 stations.

b. Candy Lake Design Memorandum No. 22, Sedimentation and Degradation Ranges, was prepared.

c. A mathematical model for sediment inflow and distribution for Canton Lake, in conjunction with WES, was initiated.

d. Segmental elevation area data for Birch, Hugo, Kaw, Lock and Dam No. 15, Lock and Dam No. 16, Oologah, Optima, and Waurika Lakes were developed.

e. Resurvey of sedimentation ranges for John Redmond and Great Salt Plains Lakes were completed.

f. A contract was initiated for installation of pole monuments on 12 sedimentation ranges on John Redmond Lake for use in making hydrographic resurveys during flood stages.

J. Special Operations. Several short-term special operations were required during the year. These are summarized as follows:

a. Releases were made from Oologah Lake on 9-11 January to remove ice in the stilling basin for inspection the latter part of January. Releases were reduced on 22 February for the stilling basin inspection.

b. Special releases were made at Keystone, Robert S. Kerr, and W. D. Mayo in September to provide flows for the annual raft races at Tulsa and Fort Smith.

c. Kaw releases were reduced on 10 August to aid the Oklahoma Water Resources Board in checking temperature of the Arkansas River from the dam to Greasy Creek. In November 1978, the lake level at Kaw Lake was lowered to elevation 1005 to enable inspection and repair of damage to the riprap protection on the upstream face of the dam. The lake was maintained at elevation 1005 until mid-June 1979 when the pool was allowed to rise to the conservation pool elevation 1010. Releases were reduced on 26 June for soundings in front of the dam to see if a siltation problem exist.

d. Exit channel repairs at Elk City Lake, initiated in July 1978, continued until 4 April 1979. Low flow releases were made through the future water supply facilities of the dam and utilized a 24-inch steel pipe around the construction area. Because of the small releases allowed through the water supply pipe, the pool level in Elk City Lake was allowed to rise to elevation 799 on 4 April instead of the seasonal pool elevation 796.

e. Releases from Toronto Lake were reduced on 12 July to repair the city of Cherryvale's water supply intake.

f. Releases were reduced at John Redmond Lake on 20 September to connect the Wolf Creek pipeline at the dam.

g. Special releases were made at Great Salt Plains from mid-August until mid-October to eliminate fish kills and for pollution abatement.

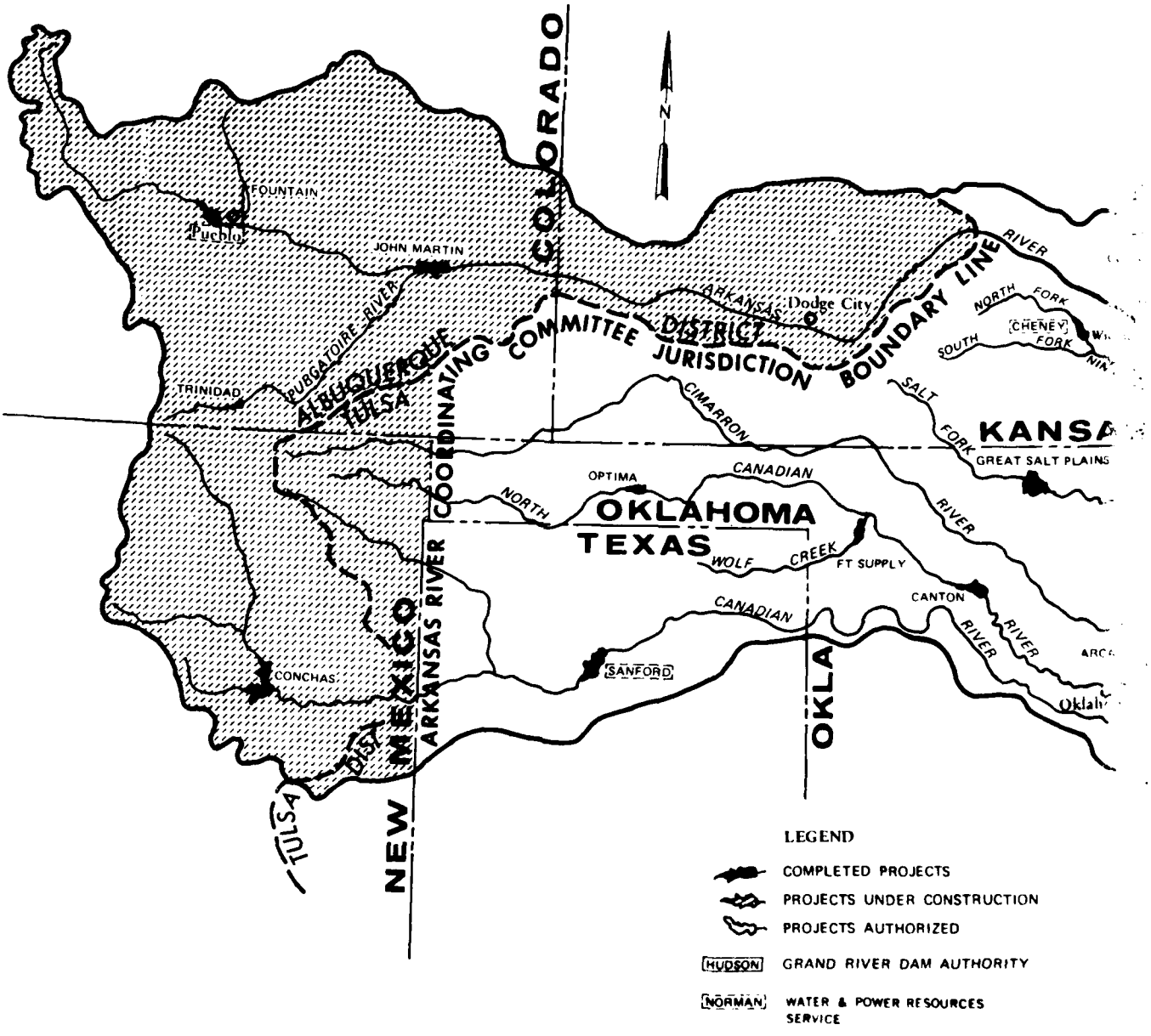
h. A deviation from the system regulation plan on the lower portion of the Arkansas River was made on 22 May. The equivalent basin storage was about 13 percent and the Van Buren guide curve indicated that a discharge of 105,000 cfs could be made. However, based on the forecasted uncontrolled flow crest of 60,000 to 65,000 cfs and weather forecasts, the flow was regulated to 60,000 cfs until the 40,000 cfs curve was reached.

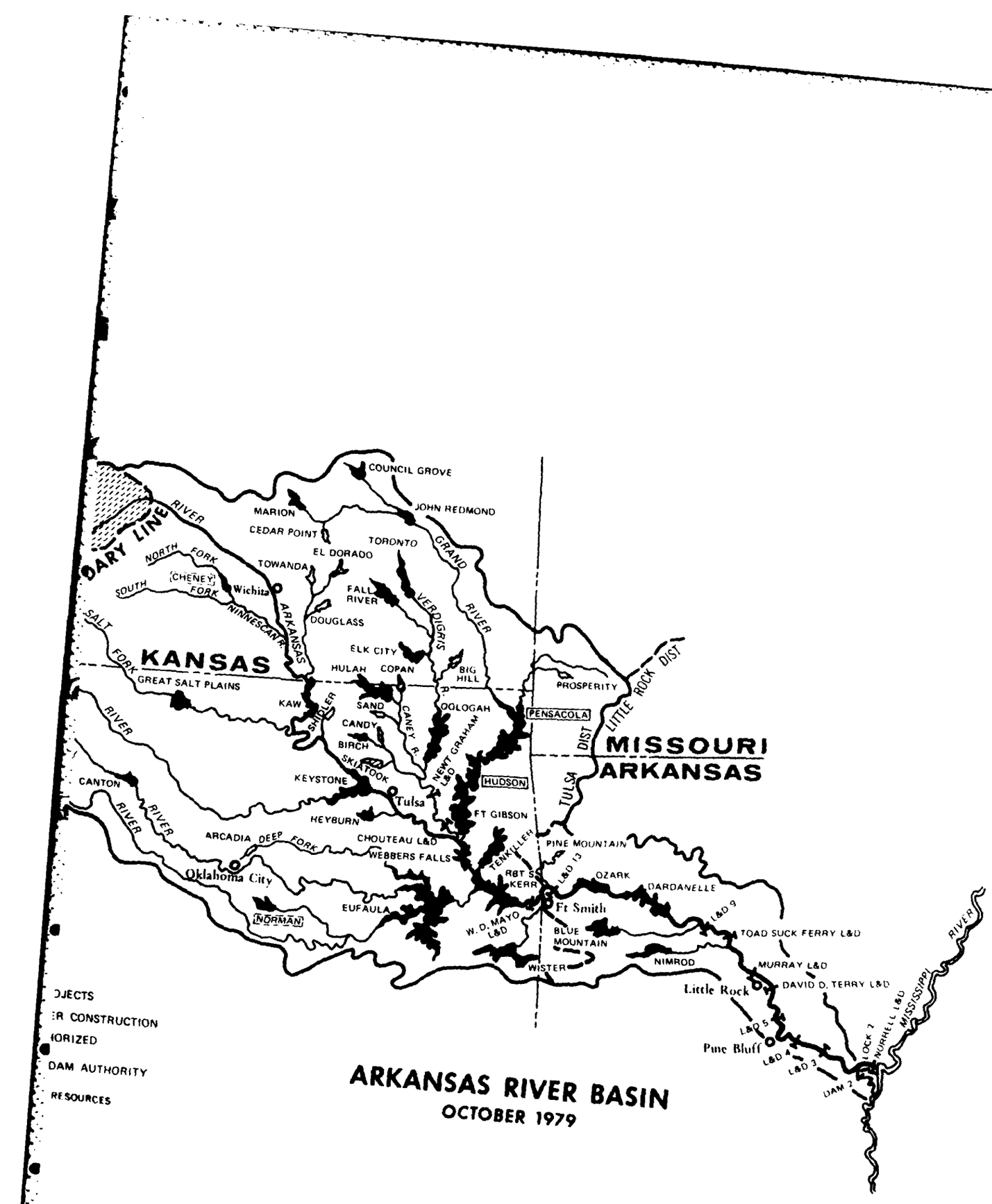
i. Nimrod Lake was drawn below the conservation pool level for repair work on the Plainview, Arkansas water supply intake structure. The drawdown was started on 11 September and completed 29 September 1979. Work on the water supply intake was completed on 1 October and refilling operations began. Refilling to elevation 342.0 was completed on 23 December 1979.

j. There were several short-term release stoppages through the year to allow for searches for drowning victims.

V. PLANS FOR 1980

The Arkansas River Basin Master Water Control Manual is planned for completion during 1980.





ARKANSAS RIVER BASIN

OCTOBER 1979

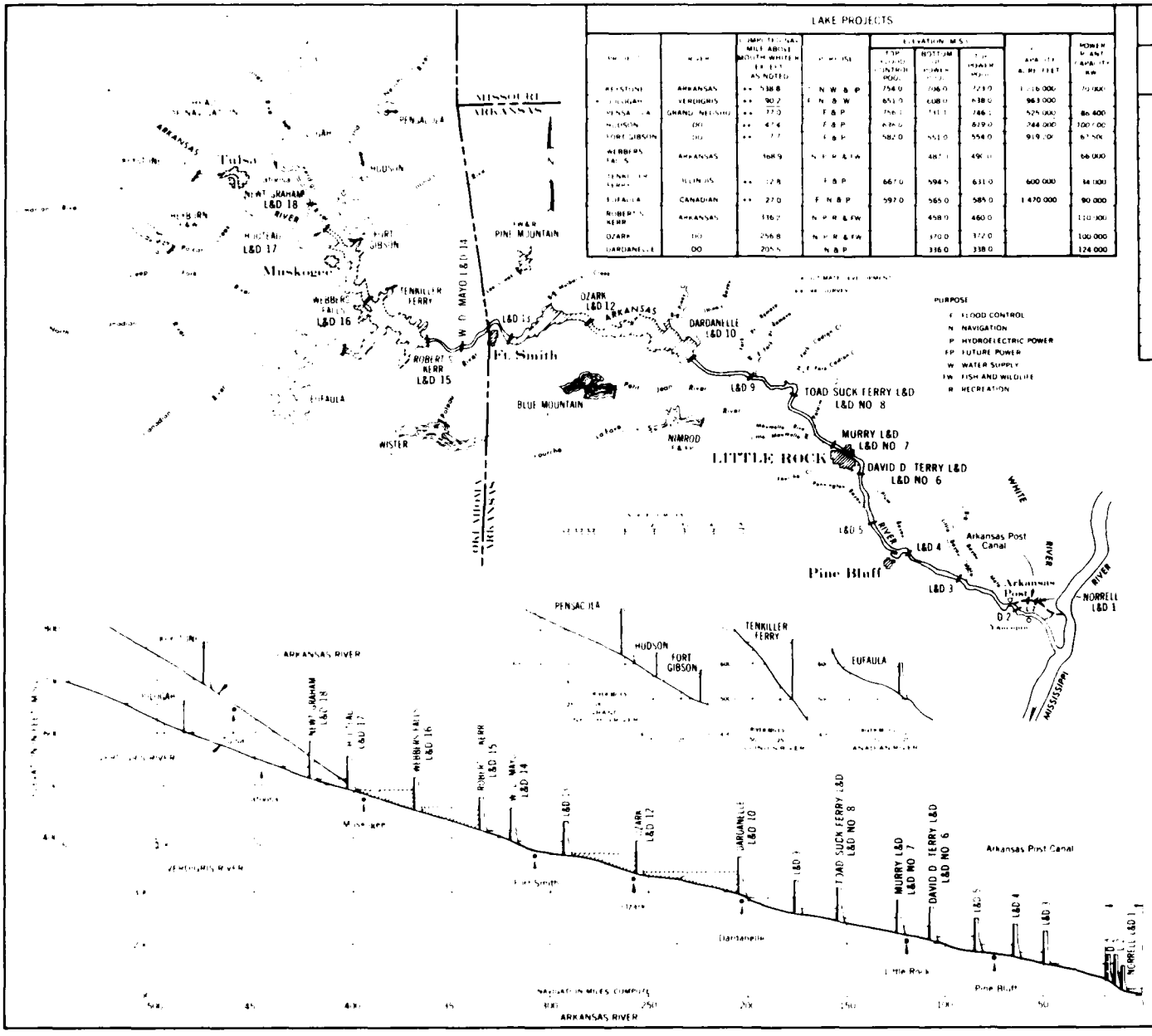
PLATE 1

ANNUAL MAXIMUM AND MINIMUM POOL ELEVATIONS
ARKANSAS RIVER BASIN PROJECTS BELOW GREAT BEND KANSAS

PROJECT	STREAM	YEAR IN OPERATION	CONSERVATION		FLOOD CONTROL		1979 POOL ELEVATIONS			
							MAXIMUM		MINIMUM	
			POOL ELEV	STORAGE AC-FT	POOL ELEV	STORAGE AC-FT	ELEV	DATE	ELEV	DATE
Cheney 1/	N. F. Ninnescah	1964	1421.6	151,800	1429.0	80,860	1429.20	2 Nov	1419.75	5 Jan
Great Salt Plains	Salt Fork Ark	1941	1125.0	0	1138.5	242,700	1127.90	5 May	1123.96	30 Oct
Kaw	Arkansas R.	1976	1010.0	343,500	1044.5	919,400	1017.10	24 Nov	1004.13	18 Feb
Keystone	Arkansas R.	1964	723.0	351,000	754.0	1,216,000	731.36	29 Mar	717.24	17 Jan
Hevburn	Polecat Cr.	1950	761.5	4,400	784.0	49,100	770.65	4 May	759.55	13 Jan
Toronto	Verdigris R.	1960	901.5	10,700	931.0	172,000	922.17	11 Jun	898.24	17 Jan
Fall River	Fall R.	1949	948.5	15,700	987.5	235,100	968.66	11 Jun	944.98	17 Jan
Elk City	Elk R.	1966	796.0	44,800	825.0	239,500	807.72	12 Jun	789.88	1 Jan
Oologah	Verdigris R.	1963	638.0	544,100	661.0	965,600	642.87	23 Nov	634.54	1 Jan
Hulah	Caney R.	1950	733.0	33,400	765.0	257,800	747.70	25 Nov	728.00	16 Jan
Birch	Birch Cr.	1977	750.5	15,840	774.0	39,000	752.47	7 May	746.34	2 Jan
Council Grove	Neosho R.	1964	1274.0	48,500	1289.0	63,800	1276.24	26 Mar	1268.74	1 Jan
Marion	Cottonwood R.	1968	1350.5	85,860	1358.5	59,900	1352.71	1 Nov	1347.05	1 Jan
John Redmond	Neosho R.	1964	1039.0	77,300	1068.0	559,000	1050.57	10 Jul	1034.39	1 Jan
Pensacola 1/	Neosho R.	1940	745.0	586,000	755.0	525,000	746.47	25 Nov	734.55	3 Jan
Lake Hudson 1/	Neosho R.	1964	619.0	0	636.0	244,000	621.79	14 Jun	617.95	16 Mar
Fort Gibson	Neosho R.	1952	554.0	53,900	582.0	919,200	557.56	14 Apr	552.78	11 Nov
Webbers Falls	Arkansas R.	1970	490.0	30,000	-	0	490.58	22 Jun	487.14	11 Apr
Tenkiller Ferry	Illinois R.	1951	632.0	371,000	667.0	576,700	635.58	16 Apr	623.11	17 Jan
Conchas	Canadian R.	1939	4201.0	273,000	4218.0	198,300	4181.00	30 Aug	4161.22	1 Jun
Sanford 1/	Canadian R.	1965	2941.3	866,300	2965.0	462,100	2894.55	1 Jan	2889.02	1 Dec
Norman 1/	Little R. (Ark)	1965	1039.0	105,900	1049.4	76,600	1039.08	7 Jul	1032.95	16 Mar
Optima 2/	N. Canadian R.	1978	2763.5	117,650	2779.0	100,500	2721.30	21 Jul	2708.20	1 Jan
Fort Supply	Wolf Cr.	1941	2004.0	400	2028.0	87,200	2015.76	12 May	2003.31	27 Nov
Canton	N. Canadian R.	1948	1615.2	97,700	1638.0	267,600	1616.46	9 Jul	1608.39	11 Jan
Eufaula	Canadian R.	1964	585.0	1,481,000	597.0	1,470,000	589.36	11 Jun	579.20	16 Jan
Robert S. Kerr	Arkansas R.	1970	460.0	79,500	-	0	460.42	28 May	458.20	8 Mar
Wister	Poteau R.	1949	471.6	30,000	502.5	400,000	502.34	9 Jun	471.14	8 Jan
Ozark	Arkansas R.	1969	372.0	19,400	-	0	372.7	12 Aug	370.0	9 Nov
Dardanelle	Arkansas R.	1964	338.0	65,000	-	0	338.3	11 May	336.2	15 Mar
Blue Mountain	Petit Jean	1947	384.0	0	419.0	233,000	415.5	13 Apr	383.8	29 Oct
Nimrod	Fourche La Fave R.	1942	342.0	0	373.0	307,000	363.9	6 Apr	335.2	1 Jan

1/ Non-Corps project under Sec 7 of 1944 F/C Act
2/ Non-significant rise in pool since closure on 2 Oct 78

PLATE 2



PURPOSE
- F FLOOD CONTROL
- N NAVIGATION
- P HYDROELECTRIC POWER
- FP FUTURE POWER
- W WATER SUPPLY
- FW FISH AND WILDLIFE
- R RECREATION

(4) POWER STORAGE
(5) REREGULATION POOL

LEGEND
- Canalization approved
- Navigation lock & dam
- Navigation Power lake
- Lake included in multiple purpose plan
- Lake in operation (not included in multiple purpose plan)
- Lake approved (not included in multiple purpose plan)

LAKE PROJECTS

LAKE	RIVER	LOCATION MILE ABOVE MOUTH WHITE OR EAST AS NOTED	PURPOSE	ELEVATION M.S.L. TOP CONSERVATION POOL	ELEVATION M.S.L. BOTTOM OF POWER POOL	ELEVATION M.S.L. TOP POWER POOL	AVERAGE ANN. FEET	NORMAL PLANT CAPACITY KW
KEYSTONE	ARKANSAS	** 538.8	F N W & P	754.0	706.0	723.0	[illegible]	70 000
[illegible]	VERDIGRIS	** 90.2	F N & W	651.0	638.0	638.0	963 000	
[illegible]	GRAND (NEOSHO)	** 77.0	F & P	796.1	741.1	786.1	525 000	86 400
HUDSON	OU	** 47.4	F & P	674.0		819.0	744 000	100 000
FORT GIBSON	OU	** 7.7	F & P	582.0	551.0	554.0	919 000	67 500
WEBBERS FALLS	ARKANSAS	168.9	N F P & FW		481.1	490.0		66 000
TENKILLER FERRY	ILLINOIS	** 12.8	F & P	667.0	594.5	631.0	600 000	84 000
EUFAULA	CANADIAN	** 27.0	F N & P	597.0	565.0	589.0	1 470 000	90 000
ROBERT S KERR	ARKANSAS	336.2	N P R & FW		458.0	460.0		110 300
OZARK	OU	256.8	N P R & FW		370.0	372.0		100 000
DARDANELLE	OU	205.5	N & P		336.0	338.0		124 000

NAVIGATION PROJECTS
River and Harbor

STRUCTURE	NAVIGATION MILE COMPUTED		UPPER POOL ELEVATION (FEET M.S.L.)	LOWER POOL ELEVATION (FEET M.S.L.)
NEWT GRAHAM L&D (18)	76.7	VERDIGRIS R	532.0	501.0
CHOUTEAU DAM (17) (2)	89.6	DO	513.0	489.0
CHOUTEAU LOCK (17)	6.5	DO	513.0	489.0
WEBBERS FALLS L&D (16) (3)	368.9	ARKANSAS R	490.0	489.0
ROBERT S KERR L&D (15) (3)	336.2	DO	460.0	432.0
W. D. MAYO L&D (14)	319.6	DO	432.0	382.0
L&D NO. 13 (4)	292.8	DO	382.0	372.0
OZARK L&D (12) (3)	256.8	DO	372.0	336.0
L&D NO. 11	(DELETED)			
DARDANELLE L&D (10) (3)	205.5	DO	338.0	336.0 287.0
L&D NO. 9 (5)	176.9	DO	286.0 287.0	266.0
TOAD SUCK FERRY L&D (8)	155.9	DO	266.0	249.0
MURRAY L&D (7)	145.4	DO	249.0	231.0
DAVID D. TERRY L&D (6)	108.1	DO	231.0	213.0
L&D NO. 5	86.3	DO	213.0	186.0
L&D NO. 4	66.0	DO	186.0	162.0
L&D NO. 3	50.2	DO	162.0	162.0
DAM NO. 2	40.5	DO	162.0	ARKANSAS R
LOCK NO. 2	13.3		162.0	162.0
NORRELL L&D (1)	10.3		162.0	112 (WHITE R.)

(2) LOCATED ON ARKANSAS RIVER 2.2 MILES BELOW UPSTREAM END OF ARKANSAS POST CANAL
(3) LOCATED ON OLD RIVER CHANNEL 0.2 MILE DOWNSTREAM OF JUNCTION WITH NAVIGATION CHANNEL

ARKANSAS RIVER AND TRIBUTARIES
ARKANSAS AND OKLAHOMA

NAVIGATION FEATURES
GENERAL PLAN AND PROFILE

SCALE AS SHOWN

LITTLE ROCK DISTRICT CORPS OF ENGINEERS
LITTLE ROCK, ARKANSAS, SEPTEMBER 1974

DRAWN GAH
TRACED GAH
CHECKED OLW

PLATE 3

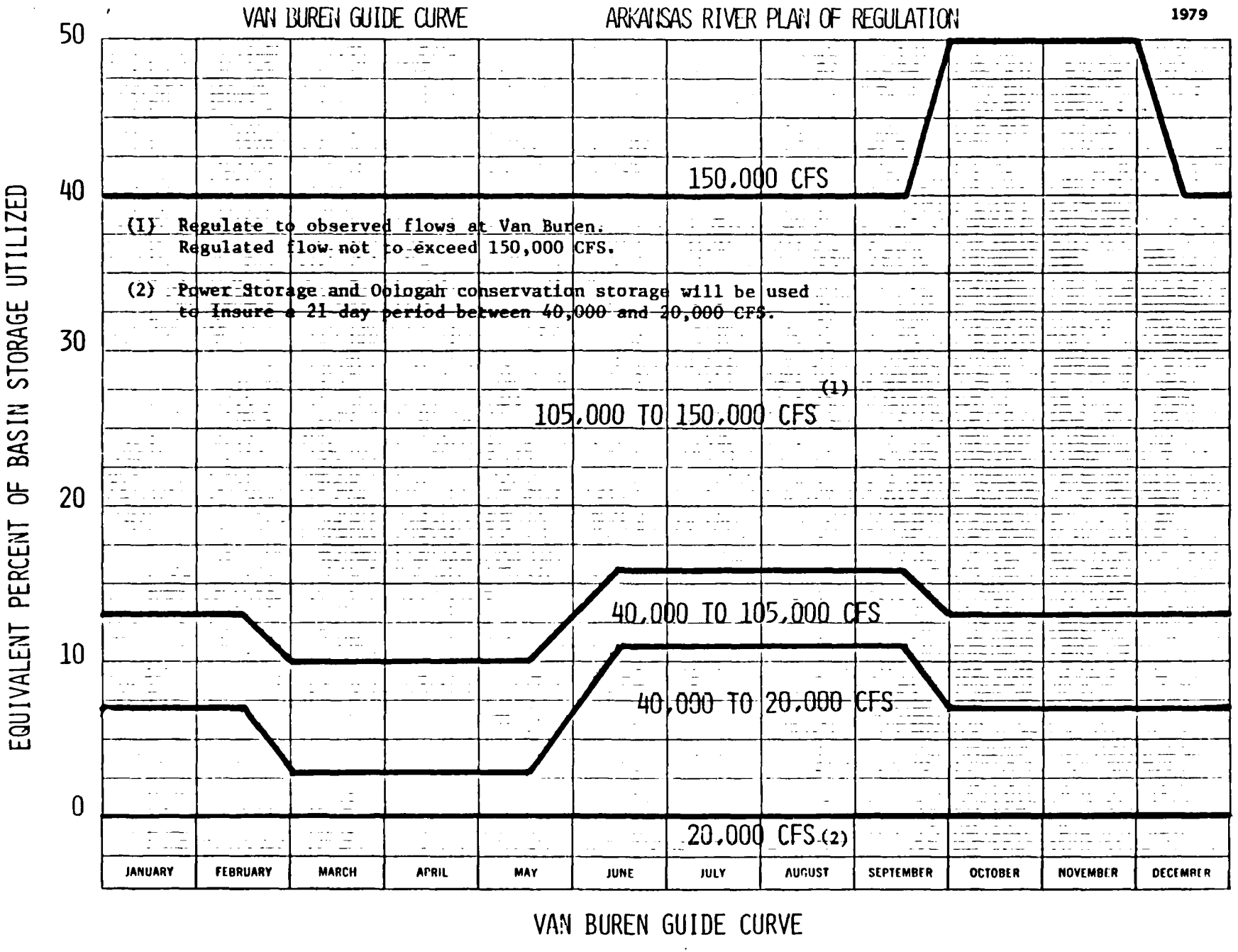

VAN BUREN GUIDE CURVE
ARKANSAS RIVER PLAN OF REGULATION
1979
50
40
30
20
10
0
EQUIVALENT PERCENT OF BASIN STORAGE UTILIZED
150,000 CFS
(1) Regulate to observed flows at Van Buren. Regulated flow not to exceed 150,000 CFS.
(2) Power Storage and Oologah conservation storage will be used to insure a 21 day period between 40,000 and 20,000 CFS.
105,000 TO 150,000 CFS (1)
40,000 TO 105,000 CFS
40,000 TO 20,000 CFS
20,000 CFS (2)
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
VAN BUREN GUIDE CURVE

PLATE 4

ANNUAL RECORDED FLOW

ARKANSAS RIVER AT DAM No. 13, NEAR VAN BUREN, ARKANSAS

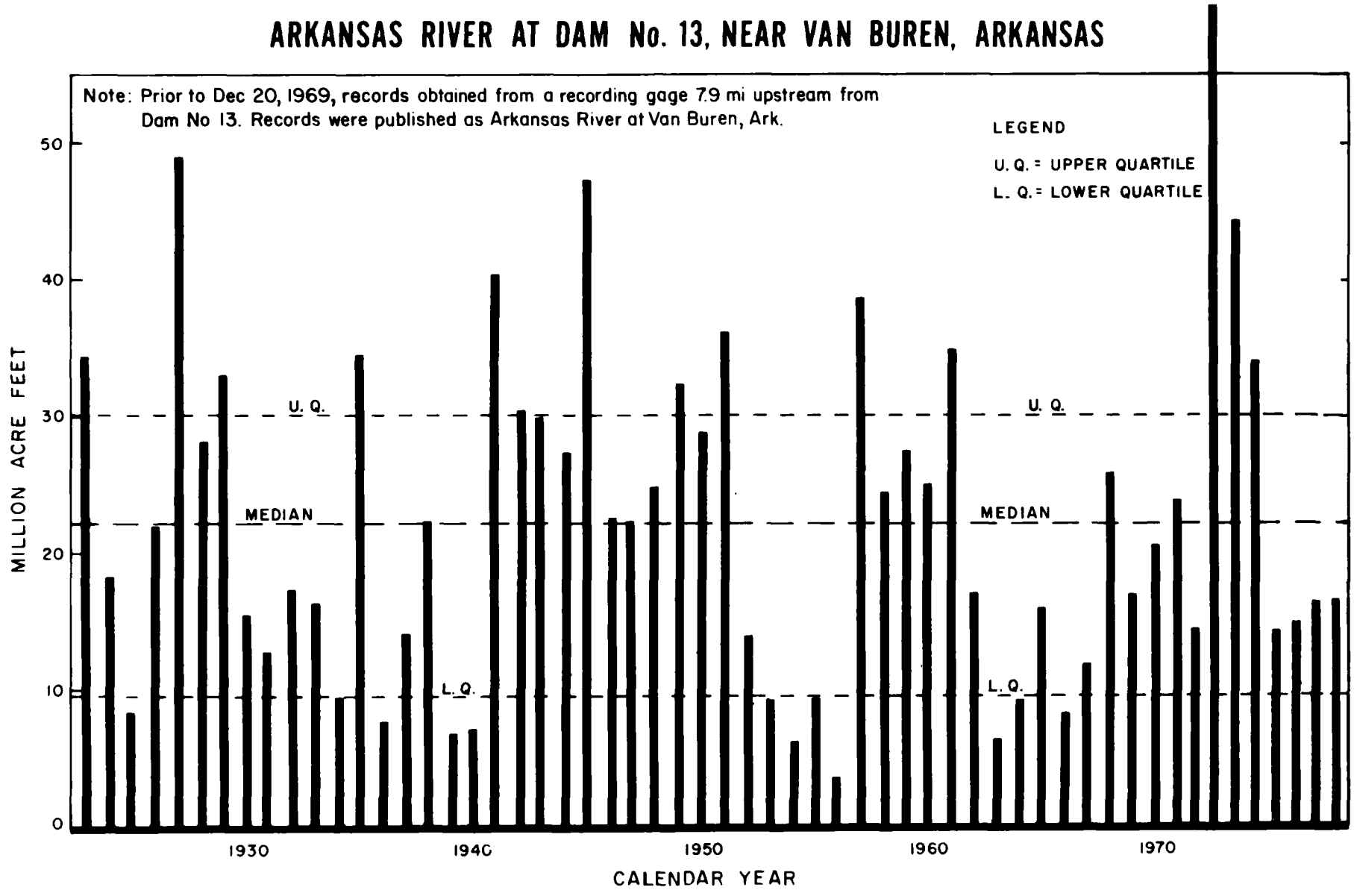
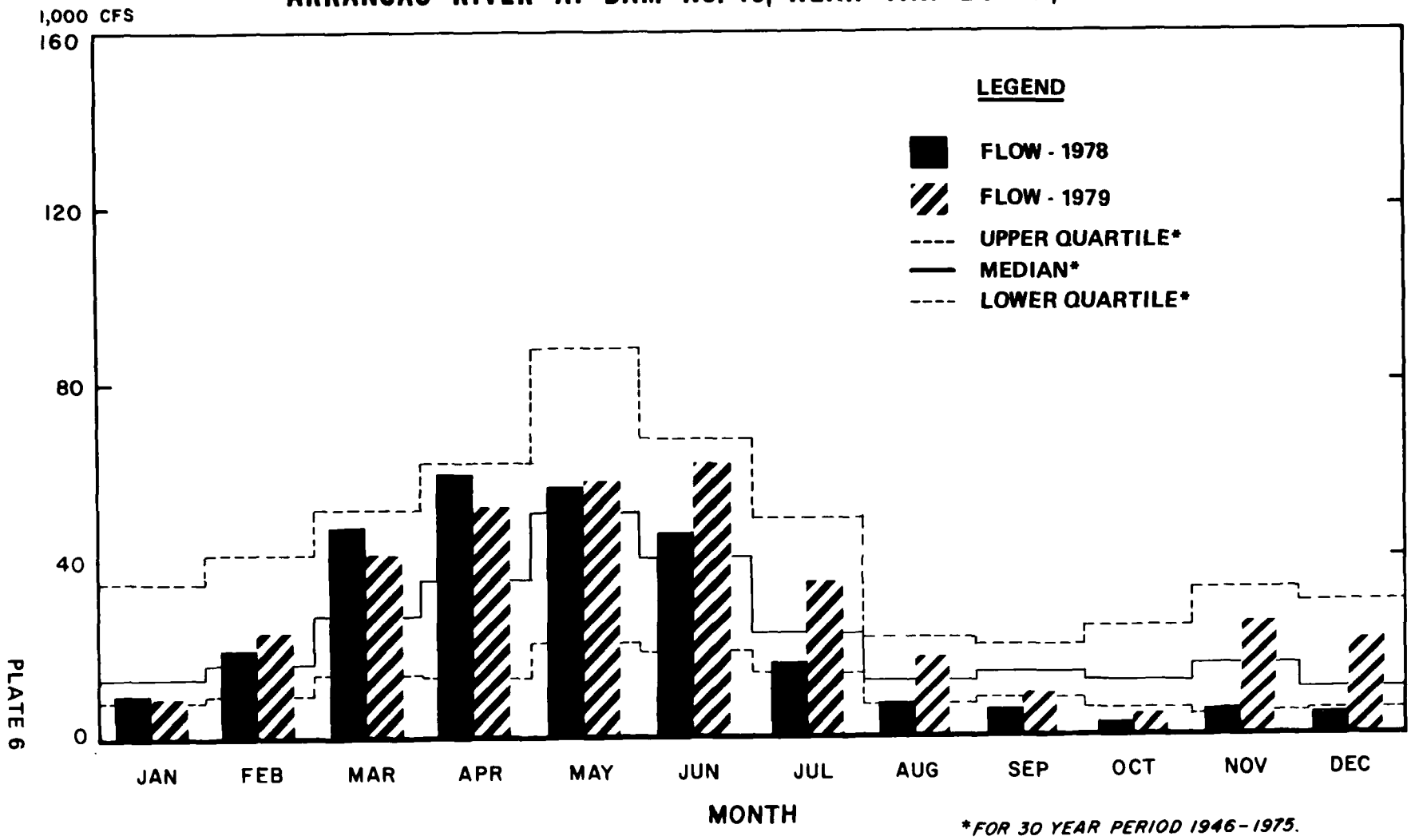


PLATE 5

AVERAGE MONTHLY RECORDED FLOWS

ARKANSAS RIVER AT DAM No. 13, NEAR VAN BUREN, ARKANSAS



*FOR 30 YEAR PERIOD 1946-1975.

PLATE 6

LOCK & DAM No. 13 - OUTFLOW HYDROGRAPH
1979

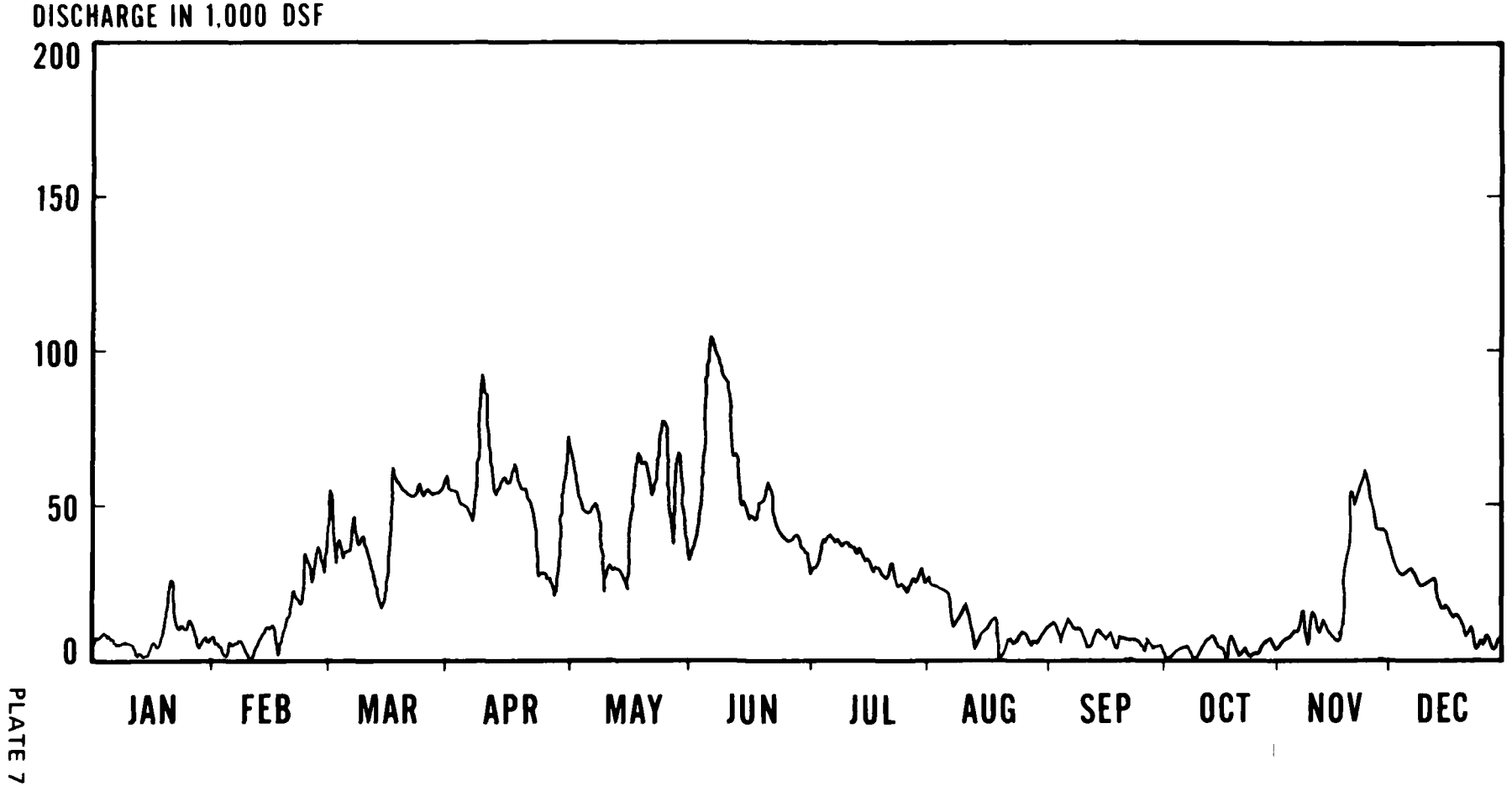


PLATE 7

KAW RESERVOIR

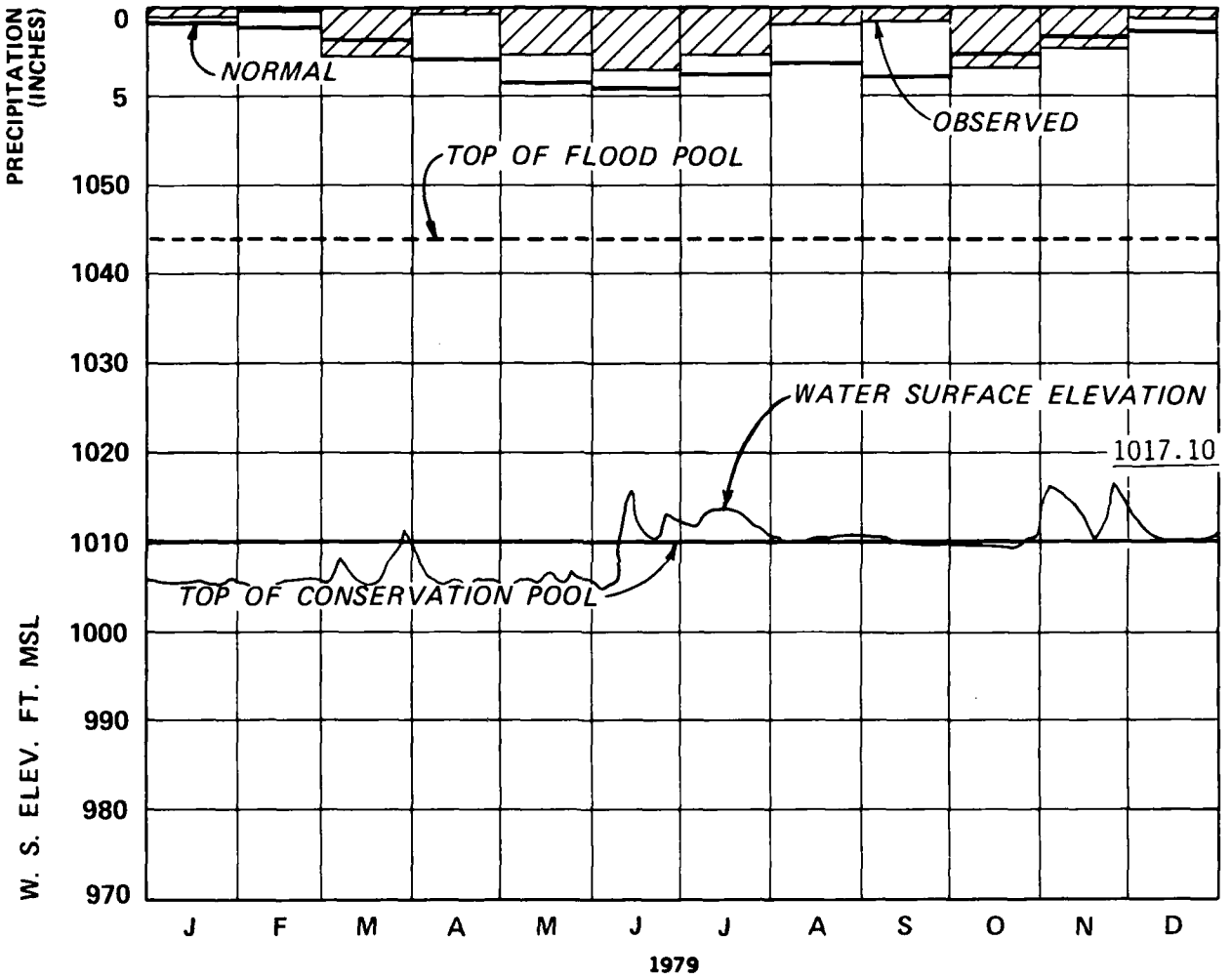
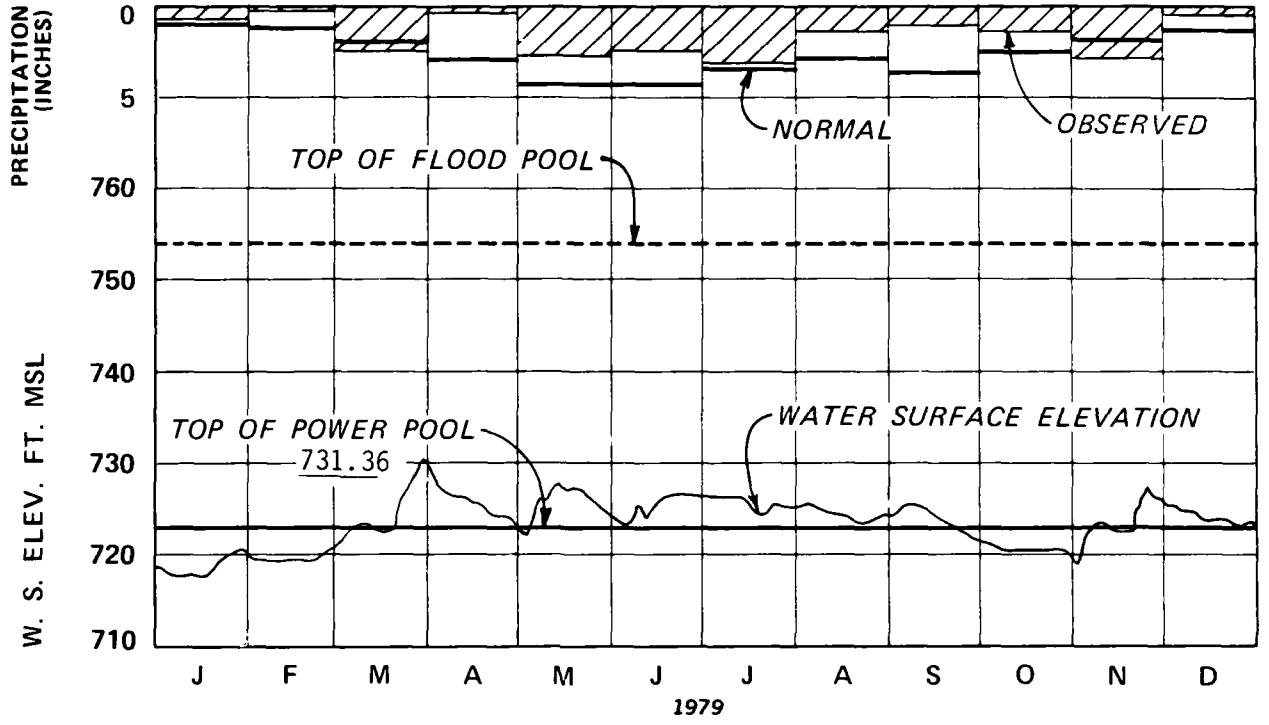


PLATE 8

KEYSTONE RESERVOIR



FALL RIVER RESERVOIR

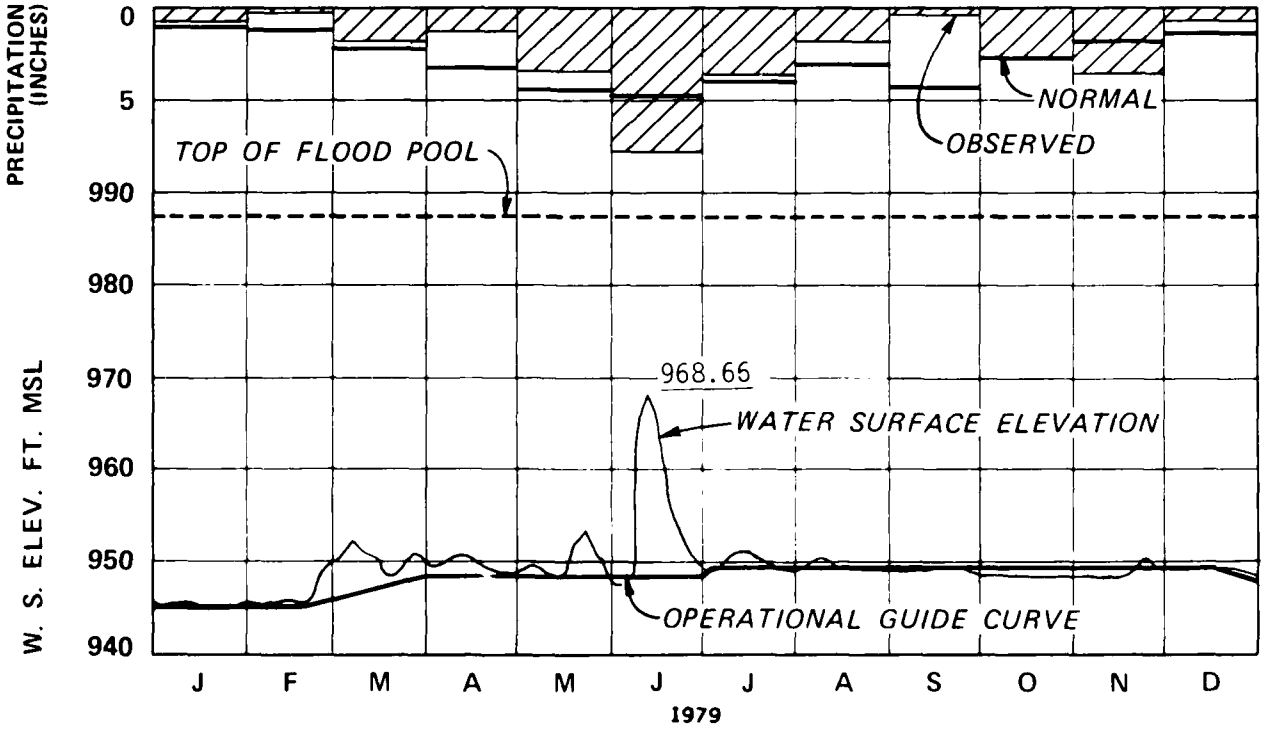
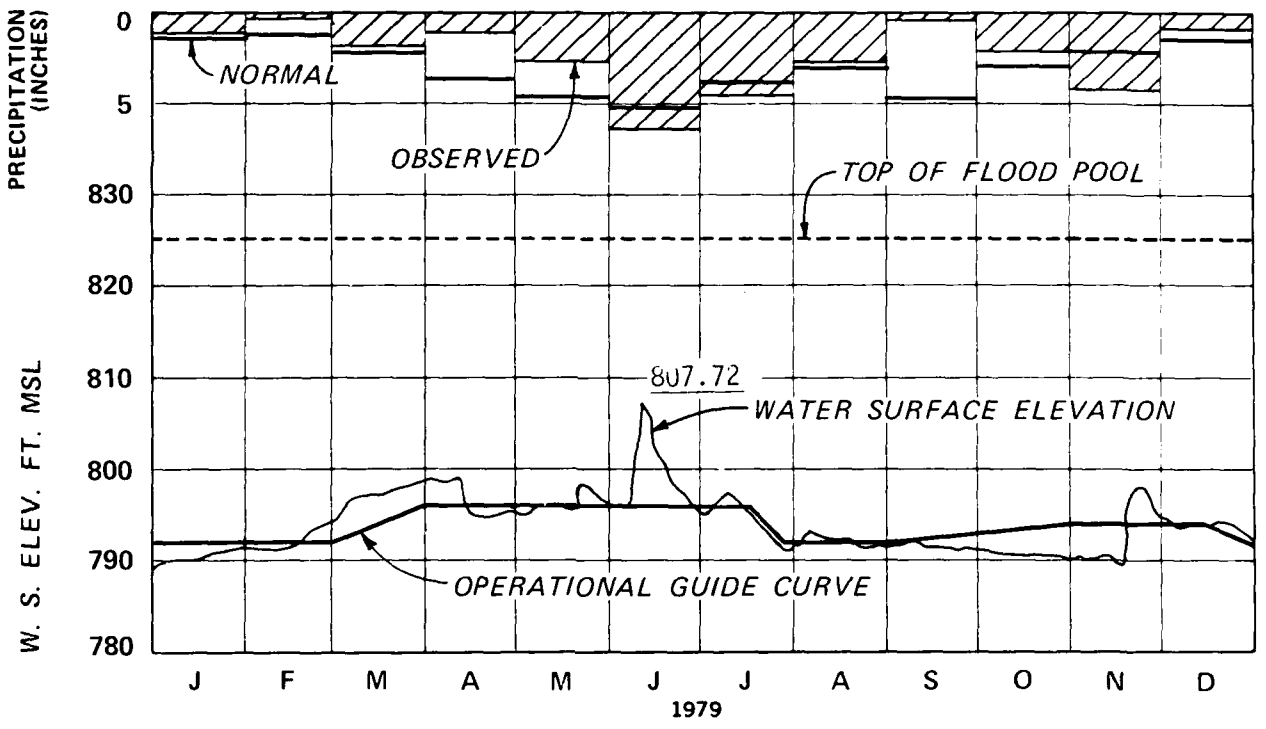


PLATE 9

ELK CITY RESERVOIR



OOLOGAH RESERVOIR

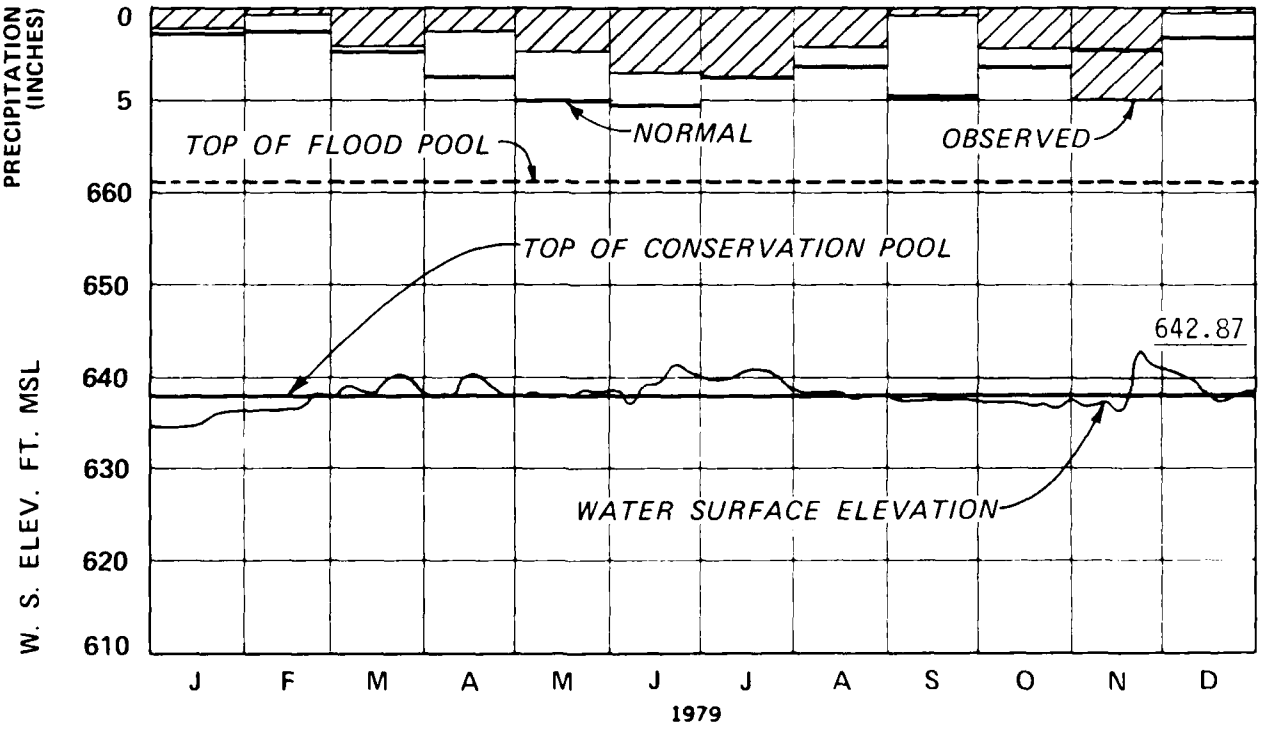
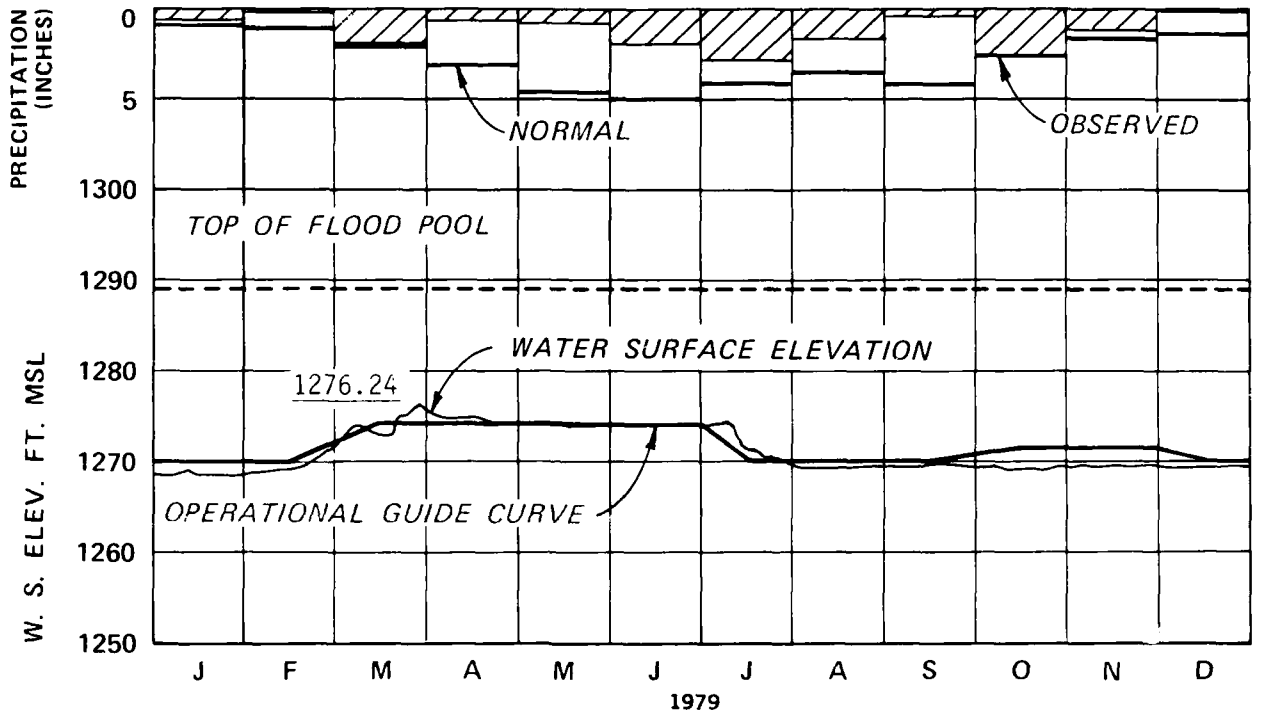


PLATE 10

COUNCIL GROVE RESERVOIR



JOHN REDMOND RESERVOIR

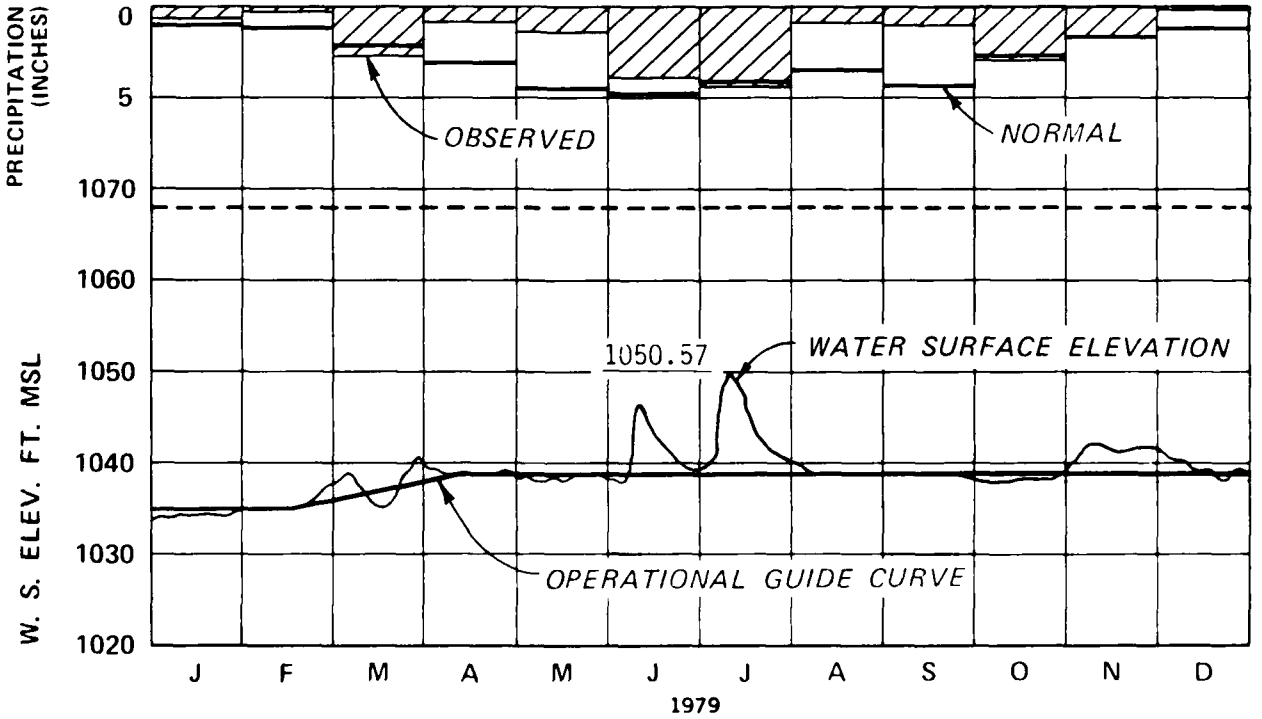
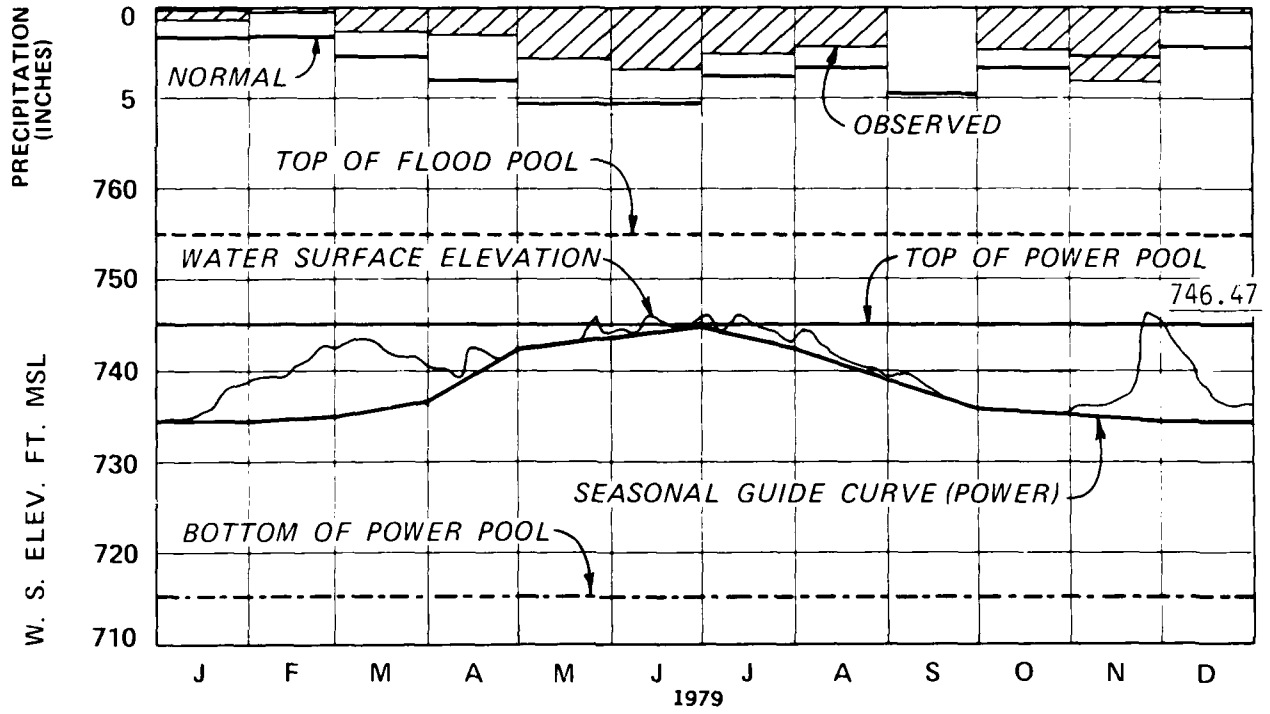


PLATE 11

GRAND LAKE (PENSACOLA) RESERVOIR



FT GIBSON RESERVOIR

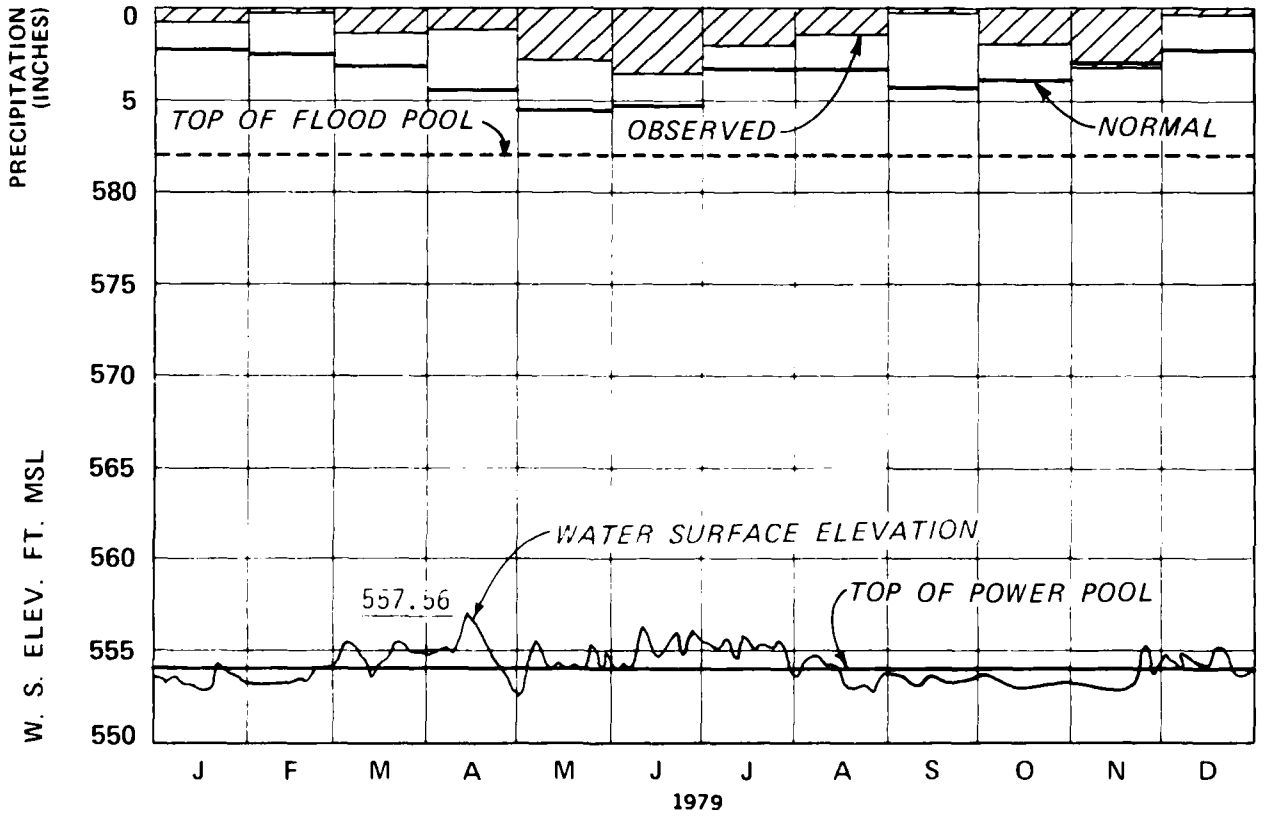


PLATE 12

TENKILLER RESERVOIR

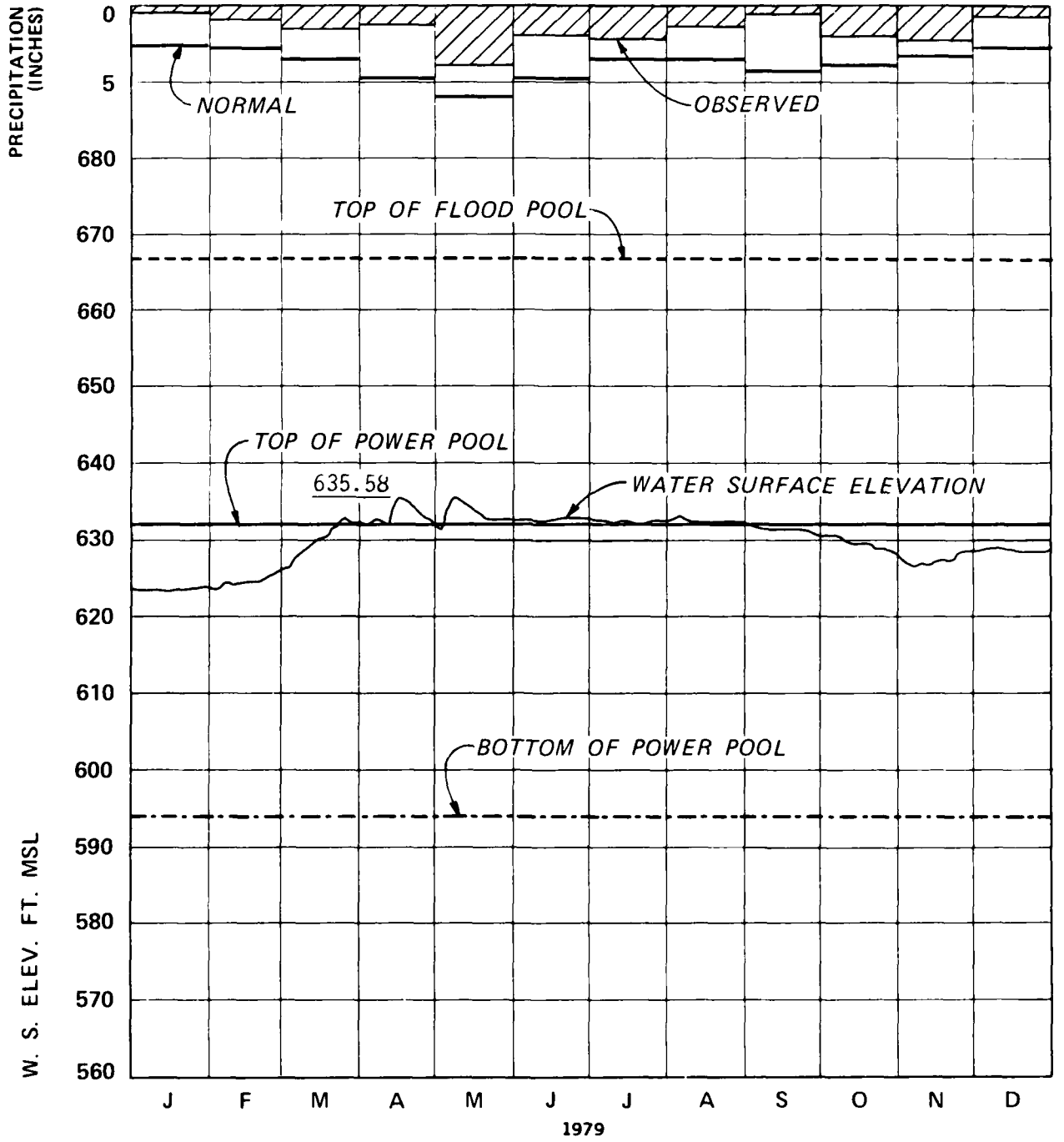
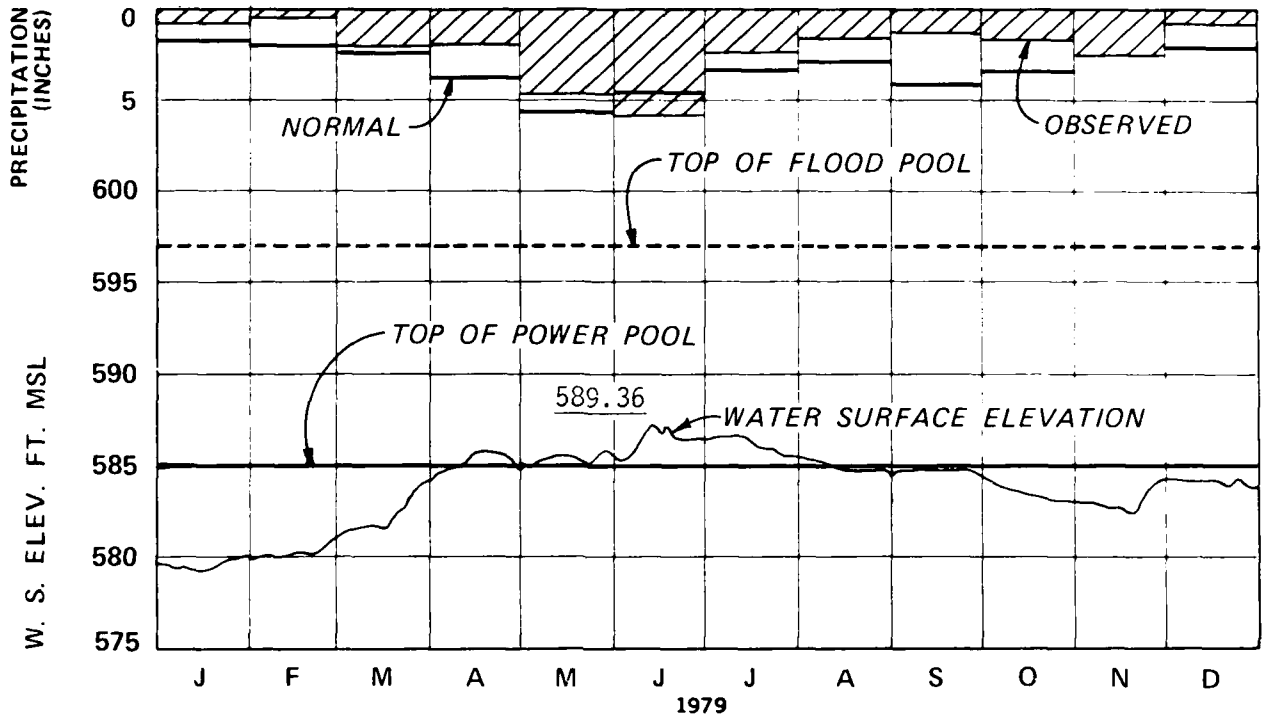


PLATE 13

EUFAULA RESERVOIR



WISTER RESERVOIR

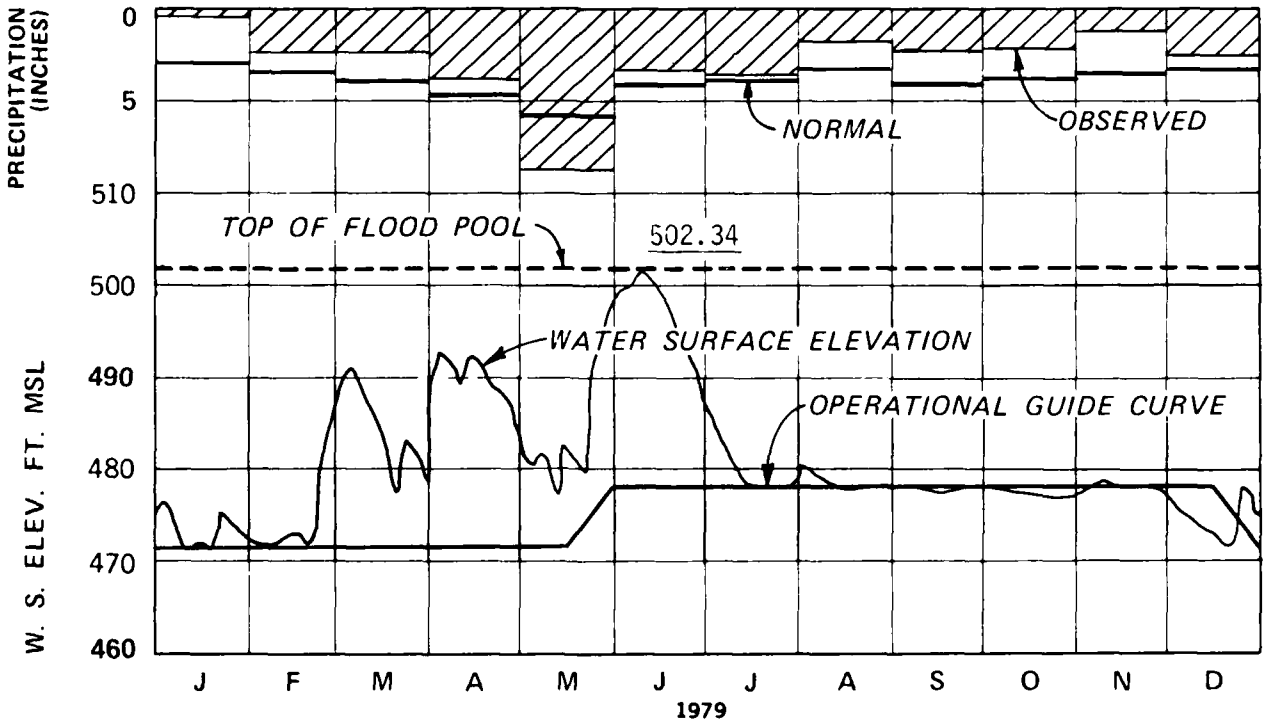
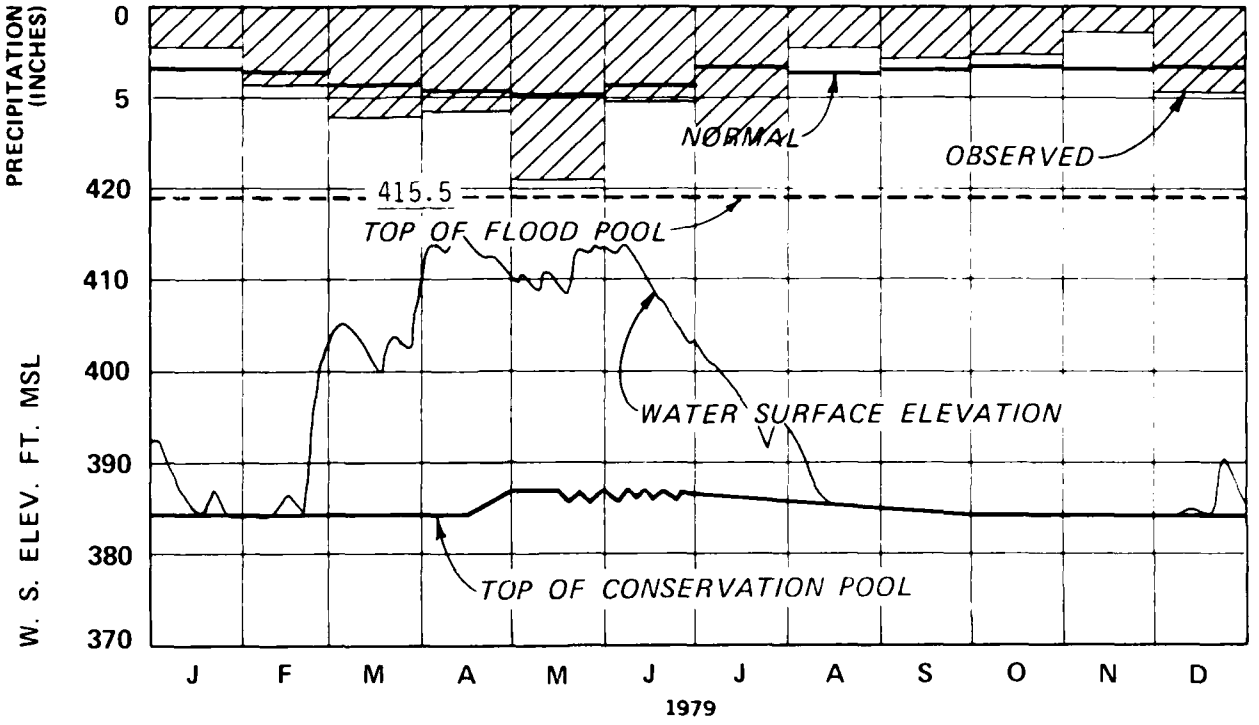


PLATE 14

BLUE MOUNTAIN RESERVOIR



NIMROD RESERVOIR

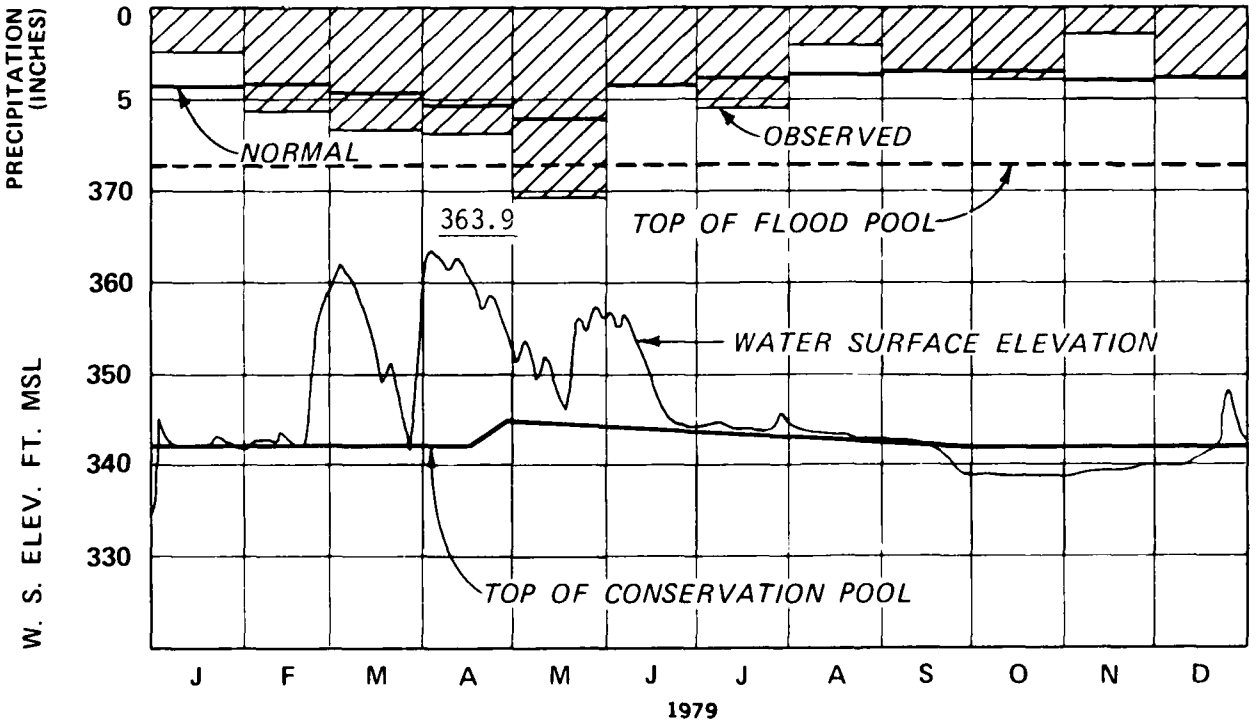


PLATE 15

FLOOD DAMAGES PREVENTED

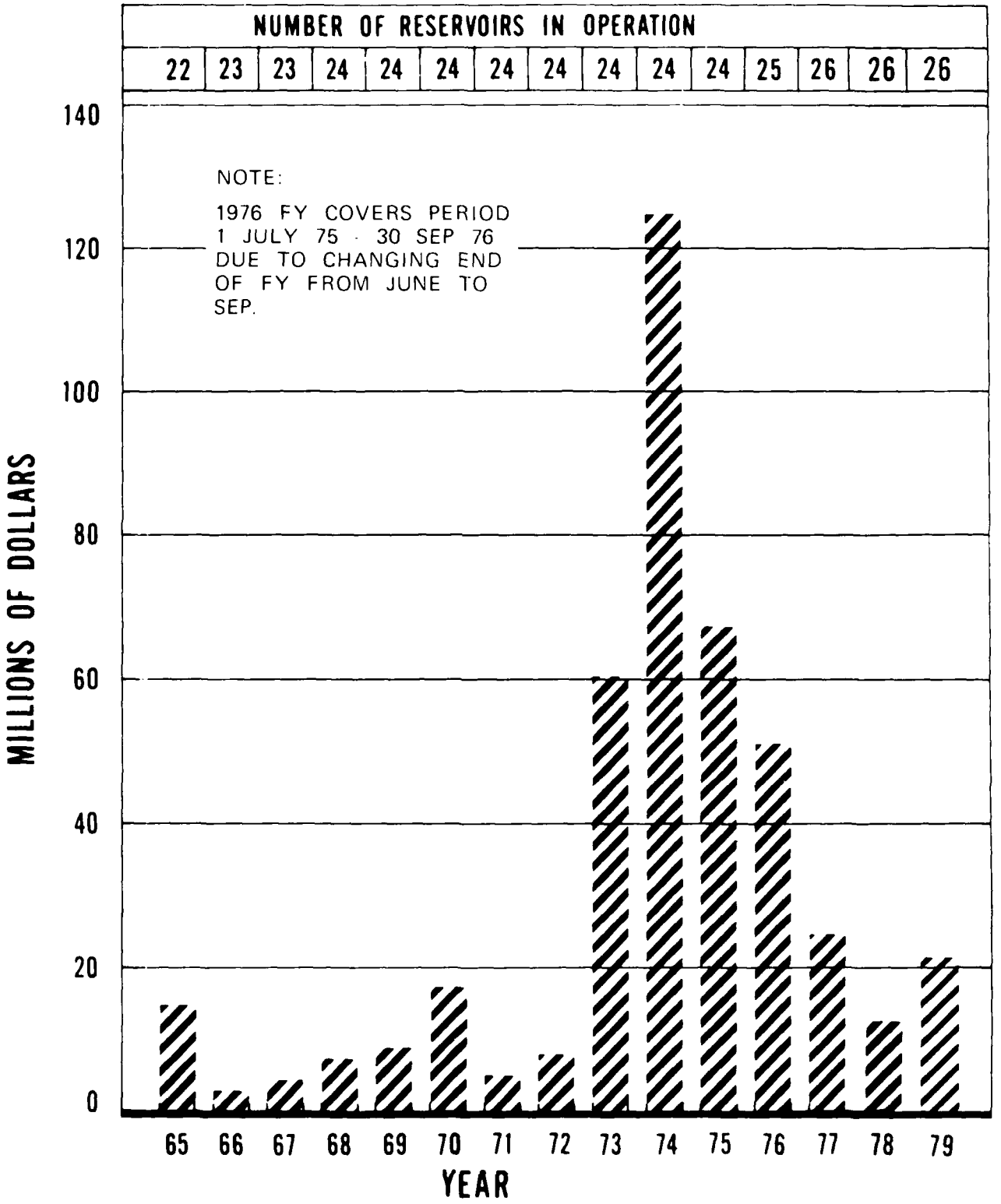
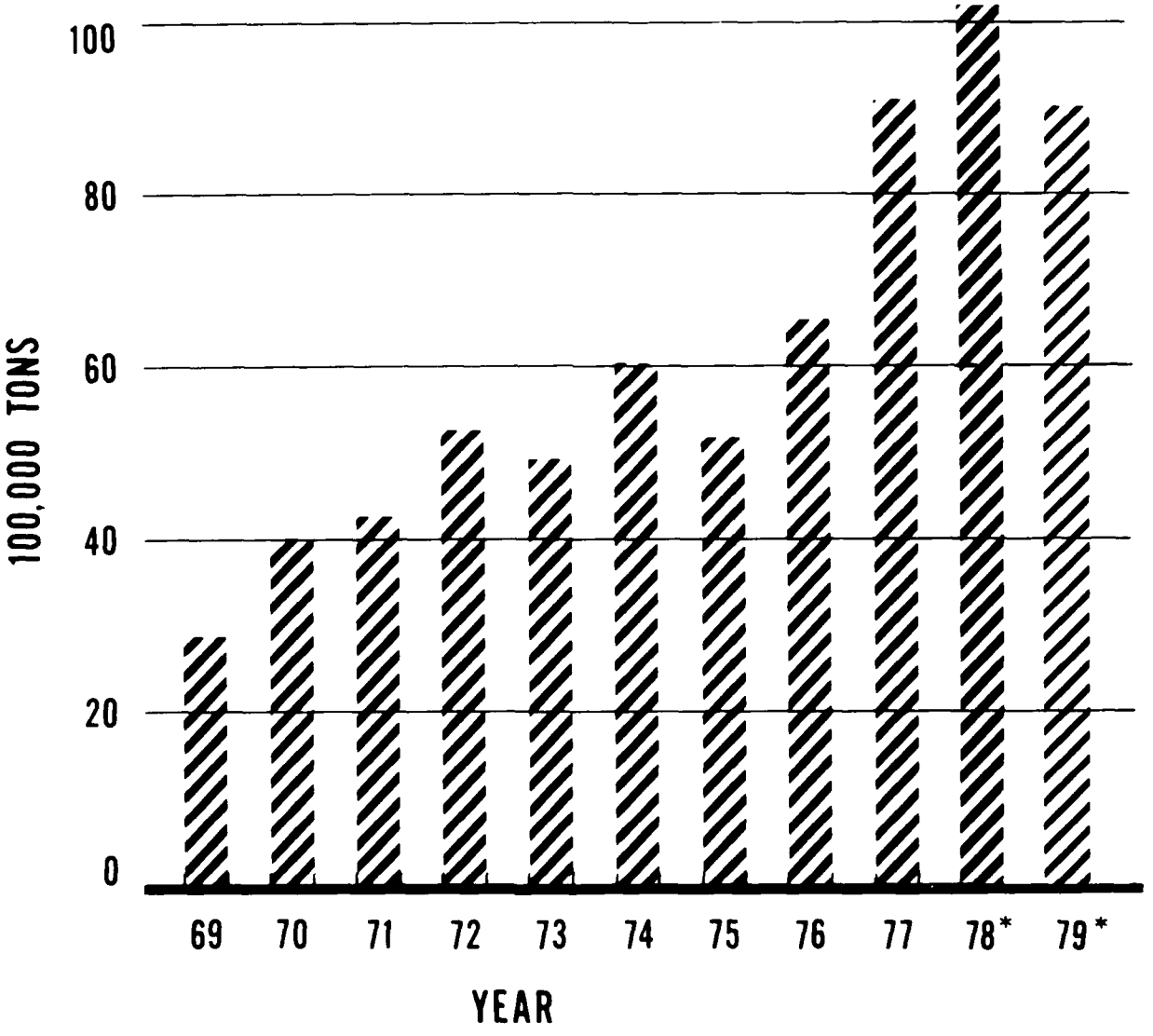


PLATE 16

FREIGHT TRAFFIC
McCLELLAN-KERR ARKANSAS RIVER NAVIGATION SYSTEM
MOUTH OF WHITE RIVER TO PORT OF CATOOSA, OKLA



*Tonnage for 1978 & 1979 based on preliminary estimates.

PLATE 17

KEYSTONE

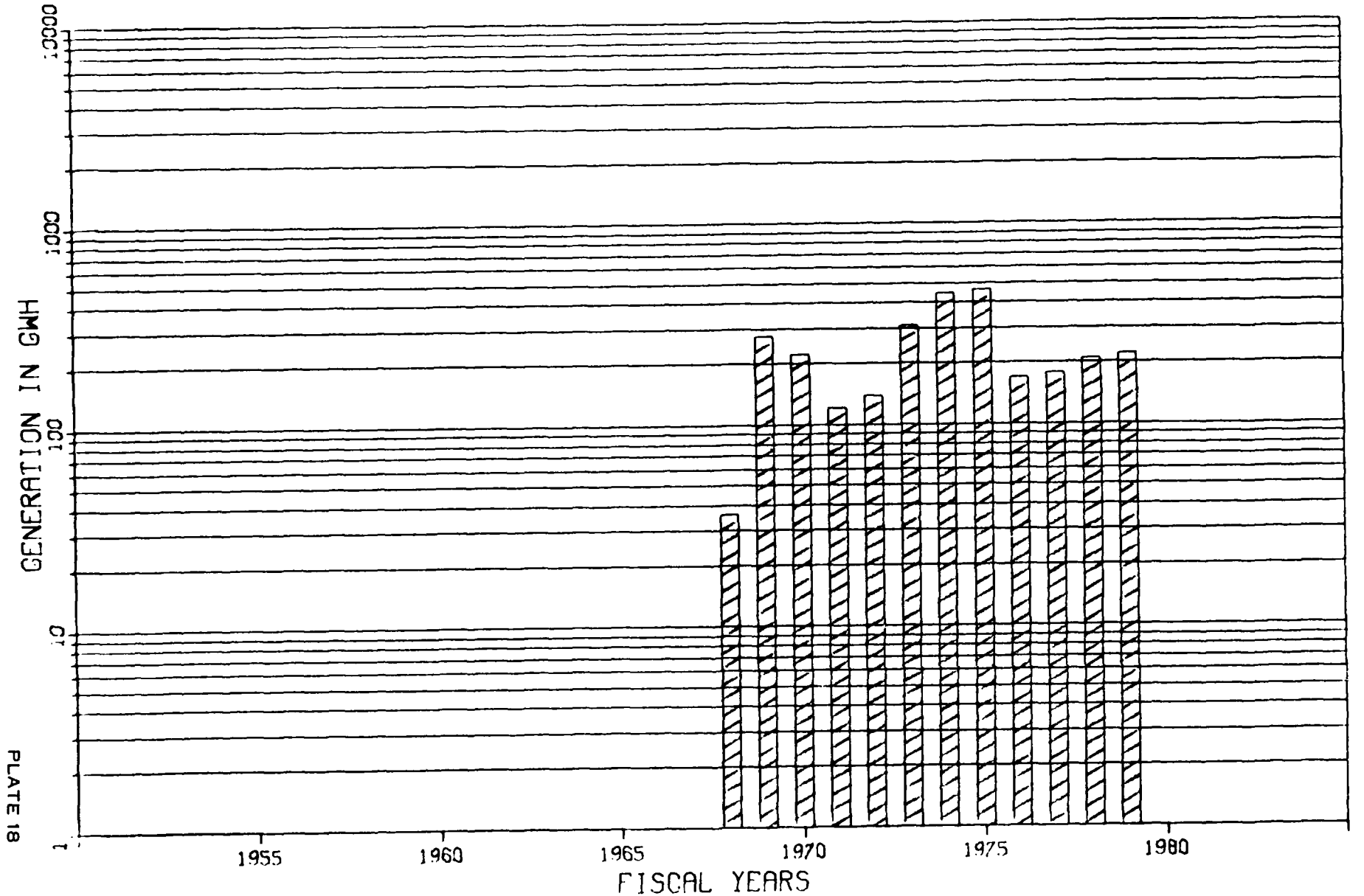


PLATE 18

FORT GIBSON

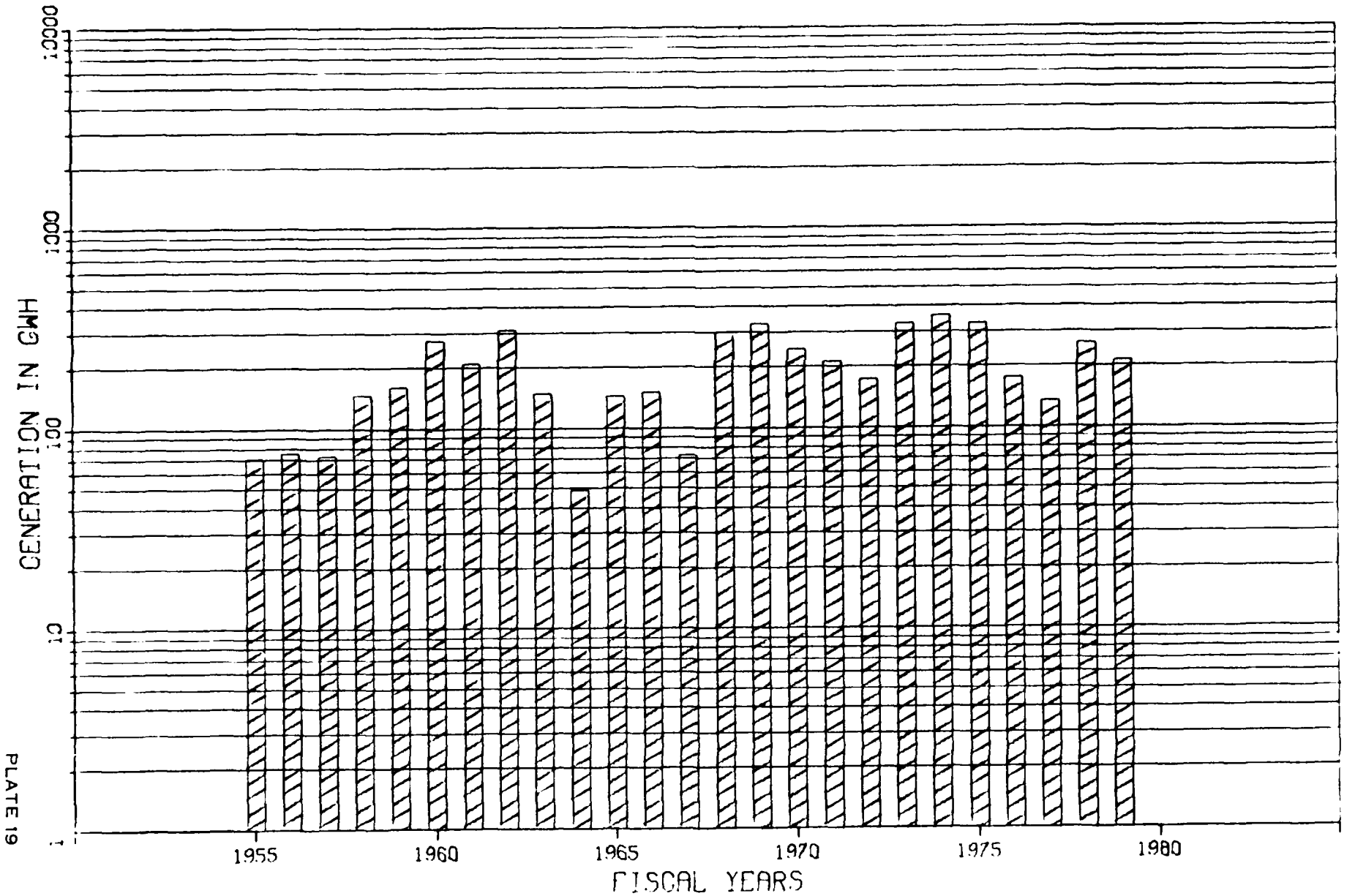


PLATE 19

WEBBERS FALLS

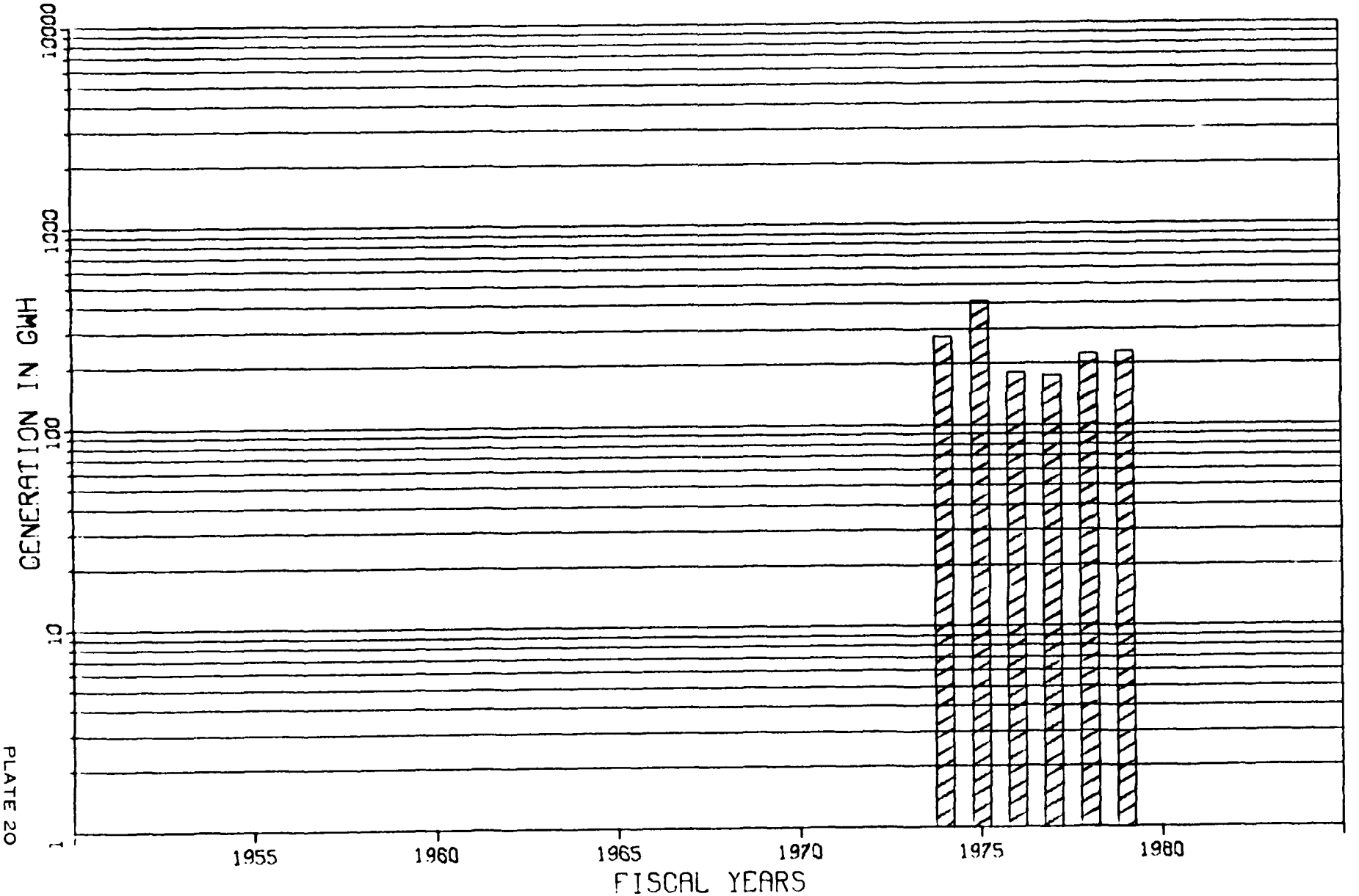


PLATE 20

TENKILLER FERRY

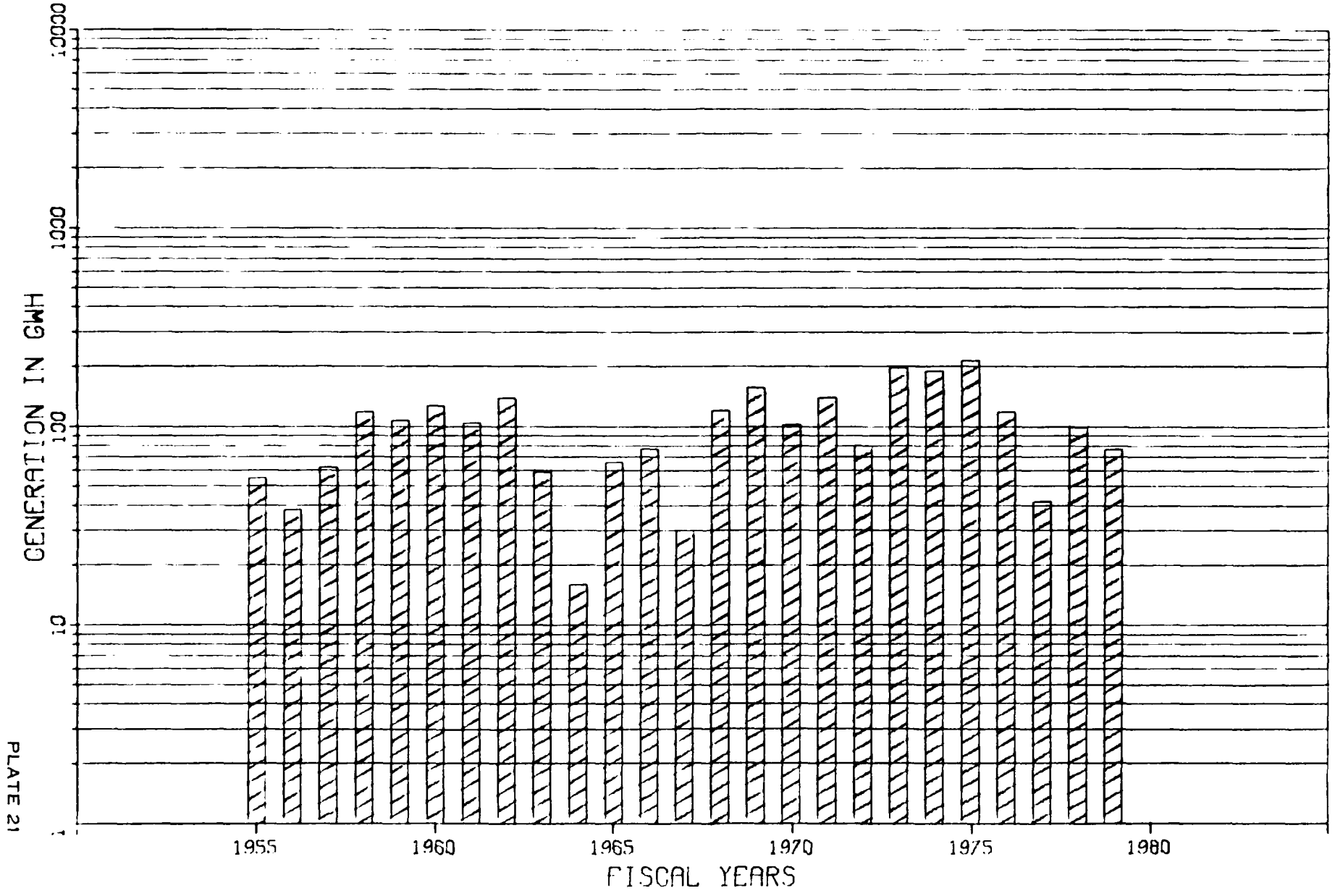


PLATE 21

EUFAULA

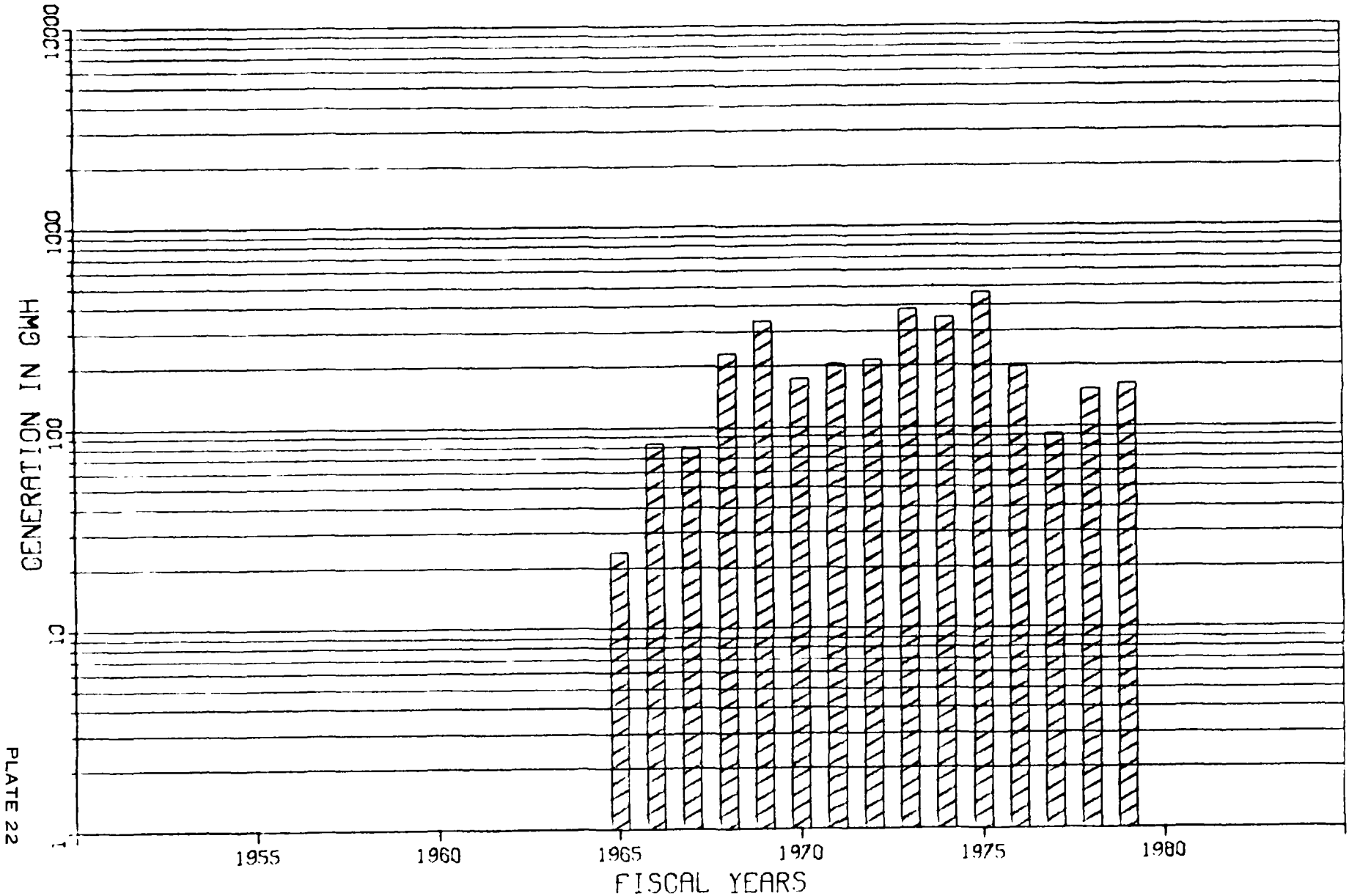


PLATE 22

ROBERT S. KERR

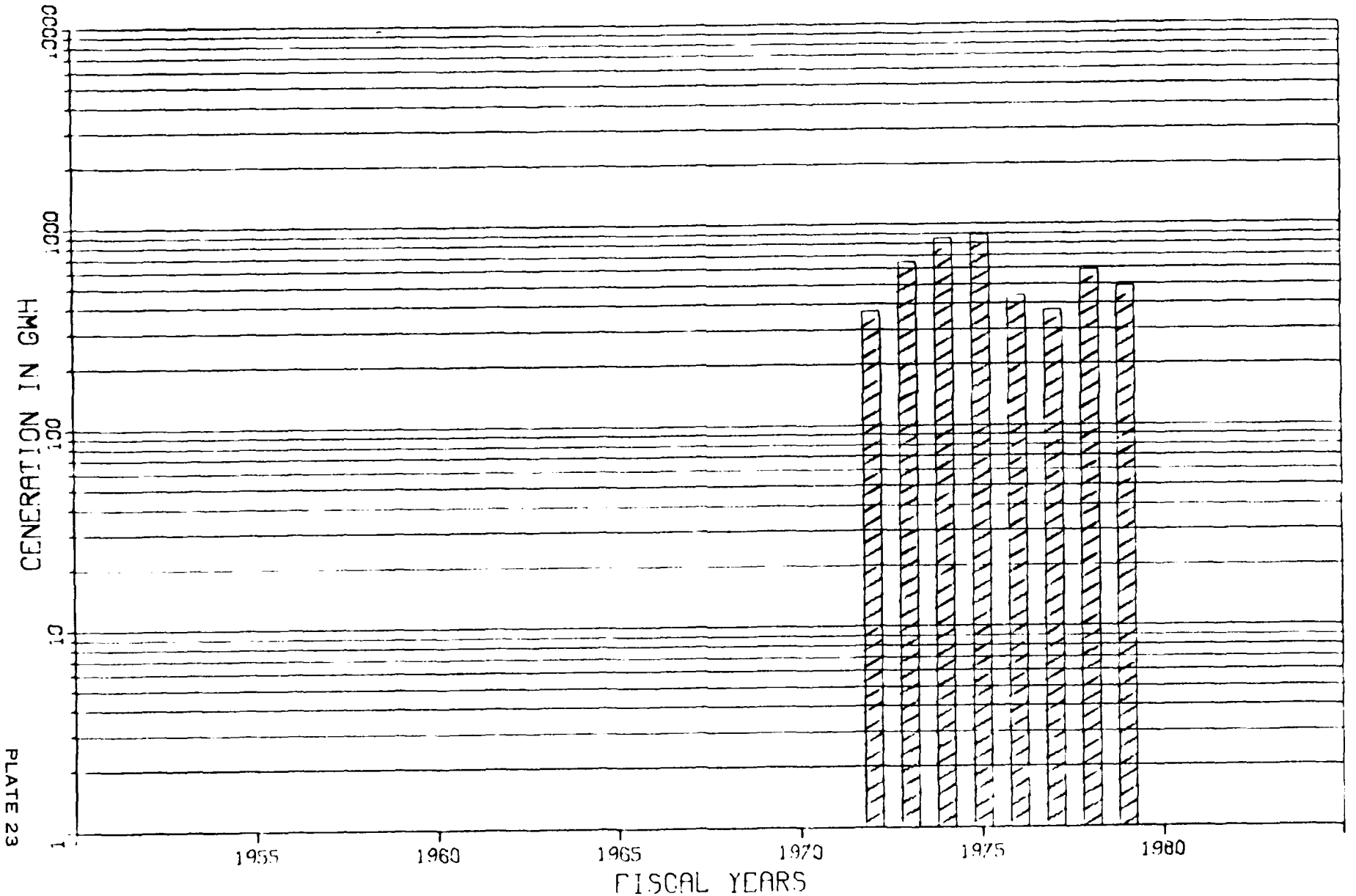


PLATE 23

OZARK

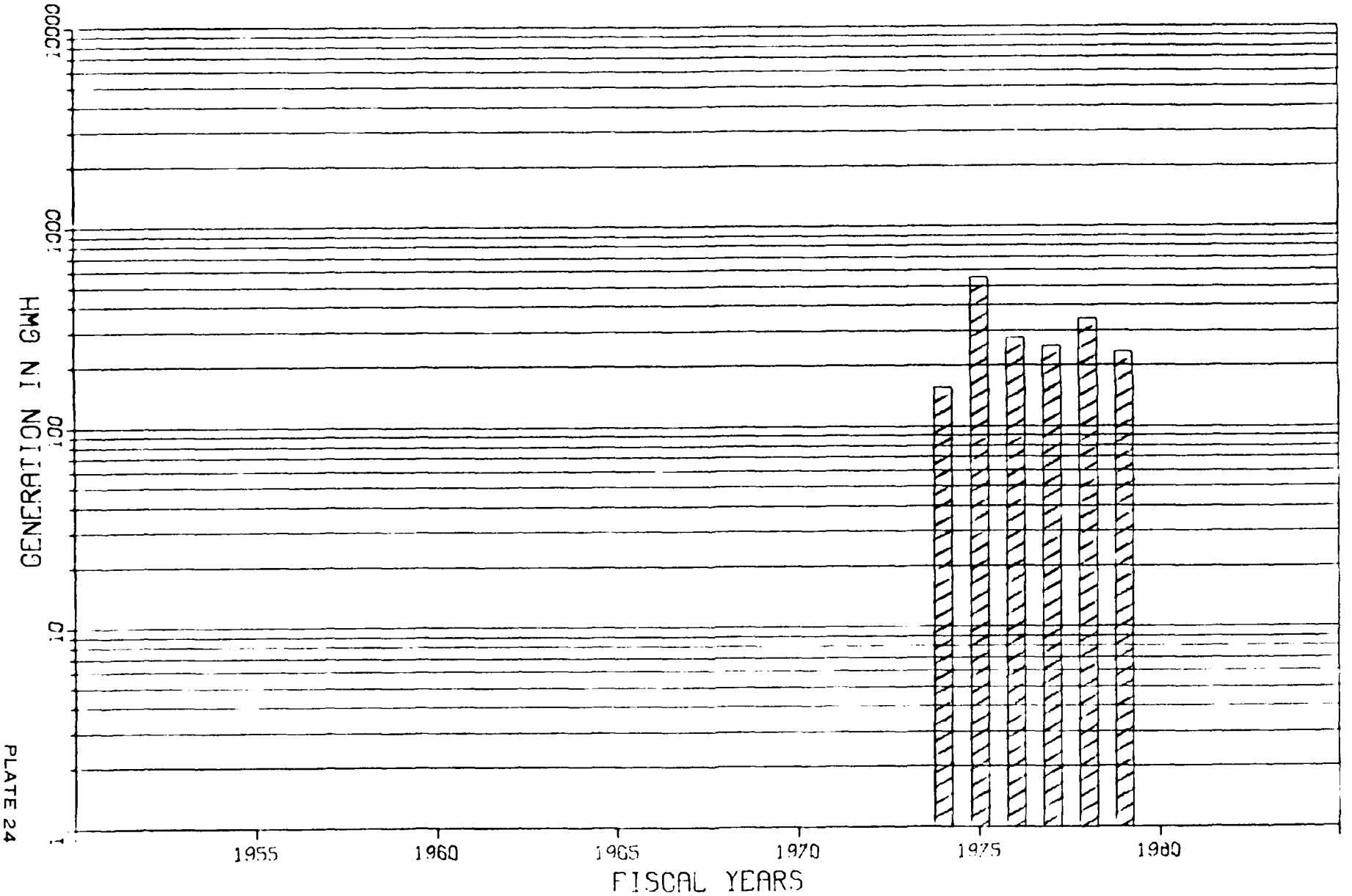


PLATE 24

DARDANELLE

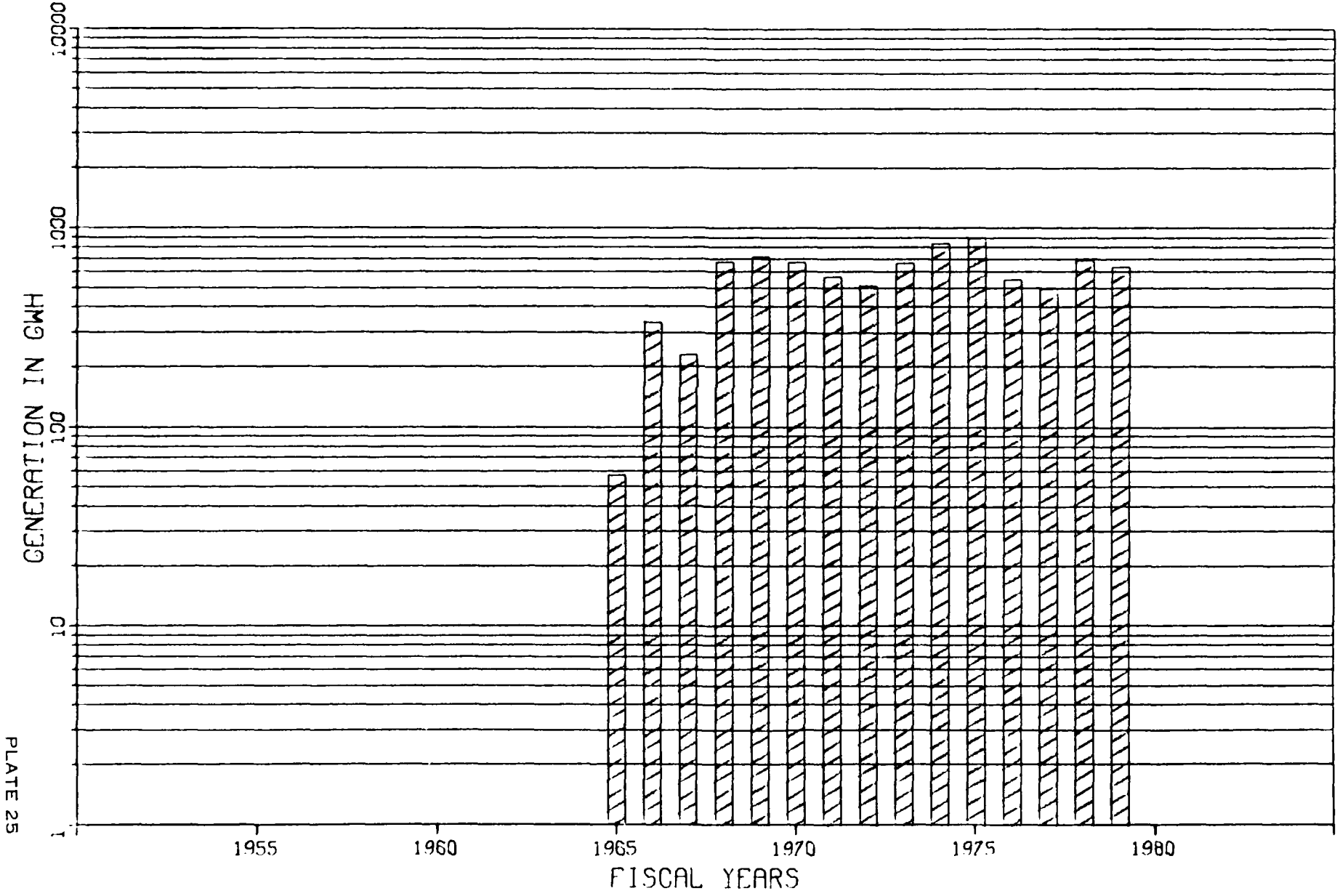


PLATE 25

Minutes

ARKANSAS RIVER BASIN
COORDINATING COMMITTEE MEETING
19 April 1979

1. Introduction. Mr. R. Terry Coomes, Chairman of the Committee, opened the meeting and introduced those in attendance. A list of attendees is furnished on inclosure 1. Terry discussed the importance of the Committee as a vehicle to show that there is a coordinated effort in the management of the water resources in the Arkansas Basin. Through the Annual Report and Annual Meeting the Committee is kept informed as to what the Corps water management objectives are. The Committee members were asked to let the Corps know if they are not getting all the information they need through the Annual Report and meeting.

2. Review of 1978 Operation.

a. Below Fort Smith. Mr. James A. Proctor, Corps of Engineers, Little Rock District, reviewed the operations below Fort Smith. Precipitation was about 10 inches below normal over most of this portion of the basin and runoff was only about 72 percent of normal. One of the main problems last summer was the low flow. This required close coordination of hydropower releases and dredging to maintain navigation in the lower reaches of the navigation system. During the year 1.2 million cubic yards of maintenance dredging was required. However, this was about 30 percent less than the dredging in 1977. A few minor navigation accidents occurred where barges collided with the structures. A special drawdown was conducted at Nimrod Lake for fish management. Flood damages prevented in 1978 amounted to about $3.7 million. Tow traffic was up about 12 percent over 1977 and recreation visits to the projects increased about 5 percent. Power production in this portion of the basin was 831 GWH which gave about $3.6 million to the power features.

b. Above Fort Smith. Mr. Ross R. Copley, Corps of Engineers, Tulsa District, reviewed the operation above Fort Smith. Generally, 1978 was a dry year with minor rises during the spring. The flow at Van Buren reached about 110,000 CFS in late March. The summer months of 1978 were the driest ever recorded at Tulsa. The seasonal pool operations were continued at the Kansas projects. However, these operations are becoming more difficult as the water supply storage space becomes more fully utilized. The seasonal pool operations are difficult due to the conflicting purposes for which these projects have to be operated. The flood control operation of 26 projects in this part of the basin prevented about $120 million flood damages. Power production was a little less than for 1977. Webbers Falls lost one

generator from service due to a fire. Visitation was down about 1 percent from 1977. Water quality samples were taken at several projects and along the navigation system.

3. Memorandum of Understanding between the Southwestern Power Administration (SWPA) and Corps of Engineers. Mr. Coomes, Southwestern Division (SWD) Corps of Engineers, presented a report on the memorandum. He stated that there is a need for the memorandum and there are some problems that should be solved by it. SWPA and the Corps have worked together since 1944 without any formal understanding as to where the division of responsibilities are, with the exception of Section 5 of the 1944 Flood Control Act. It is clear that SWPA is responsible for marketing the energy from the Corps of Engineers projects. However, conflicts begin to occur when, in the process of marketing this energy, SWPA places operating responsibilities upon the project which are in conflict with other project purposes. As the system became more complex with the addition of projects, the conflicts have increased.

The projects have to be operated for the best balance of all the project purposes. This requires consideration of the impact of power schedules on the accomplishment of other project purposes. More and more interaction between SWPA and the Corps of Engineers is being required by the many constraints which are being placed on the projects. The basic point of discussion between the Corps of Engineers and SWPA is for operational agreements in agency responsibility and authority over the management of reservoir storage allocated to hydropower. The agreement that is being developed will serve as an umbrella which specific operating arrangements will be developed to resolve specific issues. The memo addresses the scheduling and availability of generation, emergencies, and exchange of data.

4. Status of National Hydropower Survey. Mr. Jerrell Sartor, Planning Division, SWD, presented a status report on the National Hydropower Survey.

a. Background. The National Hydropower Resources Study was authorized under Public Law 94-587 (October 22, 1976). Section 167(a) authorizes and directed the Secretary of the Army, acting through the Chief of Engineers, to conduct a study of the most efficient methods of utilizing this nations hydropower resources. The study is scheduled for completion in FY 1981. Diminishing reserves of traditional primary energy sources, oil and natural gas, have prompted a national energy policy which emphasizes both conservation and the development of new sources of energy. Hydroelectric power is one of the nation's sources of primary energy which provides a valuable increment of our electrical generating capacity. This hydroelectric power resources study is national in scope and will include all 50 states and territories. The National Hydropower Study will assess the realistic potential contribution that hydroelectric power can make in meeting the nation's growing electric energy requirements.

To achieve the purpose of the study, six primary objectives have been established:

(1) To analyze and define the nation's need for hydroelectric power.

(2) To assess the physical potential for increasing hydroelectric power capacity and generation.

(3) To analyze the current institutional and policy setting element of hydroelectric power planning, development, marketing and utilization.

(4) To determine the feasibility of increasing hydroelectric generation capacity by development of new sites, by the addition of generation facilities to existing water resource projects, and by increasing the efficiency and reliability of existing hydropower systems.

(5) To assess the general environmental and socio-economic impacts of hydroelectric power development.

(6) To recommend to Congress a national hydroelectric power development program and any institutional and policy modifications which would increase the effectiveness of existing and future hydroelectric power development.

b. SWD Role. SWD was assigned the job of managing Hydroelectric Power Systems Identification component of the study for IWR and began participating in the study about 15 months ago. The first step was to prepare a data base of existing and potential sites and then develop a screening process. There were about 70,000 sites in the data base. The first screening reduced the number of existing and potential sites to about 18,000. These 18,000 sites are being further screened to obtain projects which have a BC ratio of 1.

5. Update on Permit Process for Small Hydro Projects. Mr. Arthur Martin, Federal Energy Regulatory Commission (FERC), Fort Worth, reviewed the current permit process. PL 95-617 titled "Public Utility Regulatory Policies Act of 1978" had two sections which related to the licensing activities of FERC. Section 213 deals with exempting conduit hydroelectric facilities from license requirements. Another part of the PL is under Title IV - Small Hydroelectric Power Projects. In accordance with Title IV, the Secretary shall establish a program to encourage municipalities, electric cooperatives, industrial development agencies, nonprofit organizations, and other persons to undertake the development of small (less than 15,000 KW capacity) hydroelectric power projects in connection with existing dams which are not being used to generate electric power. Title IV also provides for establishing loans for feasibility studies and project costs. It also provides for establishment of simplified and expeditious licensing procedures.

6. SCS Erosion Study. Mr. Alan D. Fortenberry, Arkansas Soil and Water Conservation Commission, gave a tape and slide presentation on the SCS erosion study. The SCS developed a data bank containing information on the various land classes and for 45 counties. Data are provided on pasture land, forest, and improvements such as feed lots, etc. Details also include major crops, conservation practices, and irrigation. Economic and wildlife data are included in the data bank. The data base system is very useful for preparing studies and reports. SCS is maintaining the files.

7. Water Supply Study in Southweast Kansas. Mr. John A. Henderson, Kansas Water Resources Board, discussed a cooperative water supply study in three southeast Kansas river basins. The study is funded by the SCS with work performed by AE contractor and includes all or most of 22 counties. Many communities and rural water districts within the area have experienced water supply problems during moderate drought periods. Groundwater is limited in most parts of the study area, so surface water is the primary water supply source. Surface water impoundments used by several communities with less than 2,500 population are too small to supply adequate water through a moderate drought. Areas where new water supply sources are needed due to quality or quantity deficiencies have been identified. Population projections have been made and future water needs determined. Potential watershed sites have been evaluated to identify those with water supply storage potential. The state will market water from six of the ten major reservoirs in the study area. The study will determine costs for building small reservoirs and treatment and distribution facilities and costs for water systems which would use water from the major reservoirs. A comparison of costs for small and large reservoir systems will help in selecting the best solutions to the area's water supply problems. State participation in development of small reservoirs may be needed because small communities cannot finance reservoir construction, especially if new treatment and distribution systems are also required.

8. Status of Arkansas River Chloride Study. Mr. Ross Copley, Tulsa District, Corps of Engineers, reported on the status of this study. Currently, they are in the process of completing the Phase I General Design Memorandum. They have been requested to go back and reevaluate the feasibility studies for the project and all work on Phase II has been delayed until Phase I is approved.

9. Automated Data Collection System Status. Mr. John Parks, SWD, Corps of Engineers, reported that the Tulsa District automated data collection system, which was reported on last year, had been approved. However, SWD has been instructed to prepare a Master Plan for a Division-wide system. All work on the district systems has been halted-until the Master Plan is completed and approved by the Office of the Chief of Engineers. The Plan is due to be submitted to the Chief's office on 30 April 1979. A reply is expected by mid-June or early July.

10. Adjourn.

Attendance List

ARKANSAS RIVER BASIN COORDINATING COMMITTEE
19 April 1979

Name	Organization
Terry Coomes	Corps of Engineers, Southwestern Division
John R. Parks	Corps of Engineers, Southwestern Division
Charles Sullivan	Corps of Engineers, Southwestern Division
Jerrell Sartor	Corps of Engineers, Southwestern Division
Ross Copley	Corps of Engineers, Tulsa District
James A. Proctor	Corps of Engineers, Little Rock District
Alan D. Fortenberry	Arkansas Soil & Water Conservation Commission
Arthur Martin	Federal Energy Regulatory Commission, Fort Worth
Dale L. Powell	Federal Energy Regulatory Commission, Fort Worth
Kendall K. Kerr	Southwestern Power Administration
John A. Henderson	Kansas Water Resources Board
Rick A. Smith	Oklahoma Water Resources Board

END

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